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THE
CHINA SEA DIRECTORY,
VOL. IV.

COMPRISING THE

COASTS OF KOREA, RUSSIAN TARTARY, THE JAPAN ISLANDS, GULFS OF TARTARY AND AMÙR, AND THE SEA OF OKHOTSK;

ALSO THE

MEIACO, LIU-KIU, LINSCHOTEN, MARIANA, BONIN, SAGHALIN, AND KURIL ISLANDS.

SECOND EDITION.

COMPILED FROM VARIOUS SOURCES

BY STAFF COMMANDER FREDERICK W. JARRAD, R.N.

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A Short Glossary of Japanese Words used in the Charts and Sailing Directions.

Japanese.	*English.*
Chisai	Little, small.
Ko, as a prefix	„
Oki	Large, great.
Ō, as a prefix	
Daibo	Fort.
Kuchi makes Guchi in the compound, as	Mouth.
Kawa guchi	The river's mouth.
Kawa makes Gawa in the compound	River.
Yama	Mountain.
Kuni	Country.
Nada	A sea.
Umi	The sea.
Seto	Strait.
Hana	Point.
Saki	Cape.
Misaki	A prominent cape.
Ura	Bay.
Minato	Harbour.
Mura	Village.
Sima, in the Yedo dialect pronounced Shima, and sometimes forms in the compound Jima, as	Island.
Awa jima	Awa island.
Hama	Coast, shore.
Tei-haku	Anchorage.
Siwo, pronounced in Yedo Shiwo	Tide.
Ō shiwo, or siwo	Spring tide.
Ko shiwo „	Neap tide.
Michi shiwo „	Flood tide.
Hiki shiwo „	Ebb tide.
Iwa	Rock.
Ishi	Stone.
Kita	North.

Japanese.	*English.*
Minami	South.
Higashi	East.
Nishi	West.
Kaze	Wind.
Ame	Rain.
Yuki	Snow.
Kumo	Clouds.
Midzu	Water.
Hi	Fire.
Tsŭki	Moon.
Ō Hi	Sun.
Ki	Tree.
Michi	Road.
Machi	Street.
Iye	House.
Hiroi	Wide.
Hoso	Narrow.
Nagai, pronounced in Yedo Nangai	Long.
Mijikai	Short.
No (possessive pron.)	Of.
Wa (the definite art.)	The.
Wo, the objective case.	
Ga (the indefinite art.)	A or any.
Kane, makes in the compound Gane	Metal.
Aki-gane (red metal)	Copper.
Kin	Gold.
Gin	Silver.
Tetsŭ	Iron.
Tomio	Lighthouse.
Se	A shoal.
Fukai	Deep.
Asai	Shallow.
Takai	High, lofty, tall.
Tera	Temple.
Fune	Boat.
Joki sen	Steamer.

Japanese.	*English.*	*Japanese.*	*English.*
Ho bune	Sailing vessel.	Fuyu	Winter.
Kuroi	Black.	Hama	Sand.
Shiroi	White.	Doro	Mud.
Hana iro	Blue.	Hashi	Bridge.
Ki iro	Yellow.	Sibansho	Guard house.
Hatoba	Wharf, landing place.	Gunkan	Man-of-war.
Gake	Cliff.	Hata	Flag.
Take	Hill.	Gats	Month.
Ikari	Anchor.	Nichi	Day.
Imo	Potatoes.	Omo kaji	Starboard.
Mame	Beans.	Tori kaji	Port.
Kochira ni asai ka	Is it shoal here?	Uma	Horse.
,, fukai ,,	Is it deep here?	Ushi	Bull.
Nin or jin	Man.	Niwatori	Fowl.
Onna	Woman.	Tamago	Egg.
Kodomo	Child.	Kamo	Duck.
Uchi	In, inside.	Karo	Magistrate.
Unjosho	Custom House.	Shikwan	Officer.
Haru	Spring.	Daimio	Noble.
Natsŭ	Summer.	Joki sha	Railway.
Aki	Autumn.	Oka	Land.
		Midzu umi	Lake.

Note.—The vowels are sounded as in the continental pronunciation of Latin; or as in the following English words;—*a*, as *a* in father; *e*, as *ay* in say; *i*, as *ee* in meet; *o*, as ō in more; and *u*, as *oo* in fool. *i* and *u* are often almost inaudible; in such cases they are written *ĭ*, *ŭ*; *au*, *ou*, and *oo* are written ō (long). The consonants are pronounced as in English.*

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* This method of writing Japanese names has been carried out in the body of this work, and it is requested that officers contributing information will follow the same rule in this respect.

ADVERTISEMENT
TO
SECOND EDITION.

The China Sea Directory, Vol. IV., comprises Sailing Directions for the coasts of Korea, Russian Tartary, and Kamchatka; for the seas of Japan and Okhotsk; for the Liu-kiu, Linschoten, Japan, Saghalin, and Kuril islands; and for the off-lying islands and dangers between the parallels of 12° N. and 35° N., and the meridians of 130° E. and 180° E.

The directions for the west and south coasts of Korea, including Korean Archipelago, are chiefly derived from surveys made by order of the Lords Commissioners of the Admiralty between the years 1859 and 1883, in H.M. ships *Actæon*, *Swallow*, *Sylvia*, *Flying Fish*, and *Magpie*. Quelpart island is from a description by Sir E. Belcher, 1845.

The east coast of Korea is principally from surveys made in ships of the Russian and French Navies, Government surveys 1852 to 1854, with additions from surveys undertaken by the Japanese Government to 1880, and more recent remarks from various authorities to 1882.

The shores of Russian Tartary to the river Amúr, and the island of Saghalin, are from Russian Government surveys to 1882, and from the remarks of Officers of H.M. Ships.

The directions for the coasts of Japan, including the Inland sea, are from surveys made in H.M. ships between the years 1855 and 1883; also from surveys made in French and United States vessels of war; and surveys recently executed under the orders of Admiral Yanagi, Imperial Japanese Hydrographer.

The descriptions of Mariana or Ladrone islands; the Bonin and other islands south-east of Japan; also Meiaco sima, Liu-kiu, and Linschoten groups are from various documents in the Hydrographic Office.

This volume has been much enlarged since the first edition was published in 1873, by remarks relating principally to the west and south coasts of Korea, as also to various parts of the shores of Japan, resulting chiefly from the surveys made in H.M. ships *Sylvia*, *Flying Fish*, and *Magpie*, between the years 1873 and 1883.

Seamen are invited to transmit to the Secretary of the Admiralty notice of any errors or omissions they may detect in this work, and also any new information they may obtain, in order that the same may be applied for the benefit of navigation.

F. J. E.

Hydrographic Office, Admiralty, London,
February, 1884.

PRINCIPAL AUTHORITIES.

Captain Broughton, R.N.	1797
Admiral Krusenstern, Russian Navy	1804
Captain Basil Hall, R.N.	1816
Captain Beechey, R.N.	1827
Dr. Siebold	1828
Captain Rees, ship *Lord Amherst*	1832
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Admiral Cécille, French Navy	1846
Commodore Perry, U.S.N.	1853–54
Admiral Guérin, French Navy	1856
J. Richards, Master, R.N.	1859–63
Commander Ward, R.N.	
E. Wilds, Master, R.N.	
G. Stanley, Master, R.N.	
Captain Don E. Sanchez y Zayas, Spanish Navy	1865
Commander Bullock, R.N.	1865–69
Commander Brooker, R.N.	
Lieutenant Banaré, French Navy	1869–72
Captain St. John, R.N.	1870–76
Captain Blakiston, R.A.	1871
Navigating Lieutenant Pearce, R.N.	1874–77
Captain Knorr, German Imperial Navy	1876
Commander Aldrich, R.N.	1878–80
Lieutenant Hoskyn, R.N.	1880–83
Lieutenant Carpenter, R.N.	1882–83

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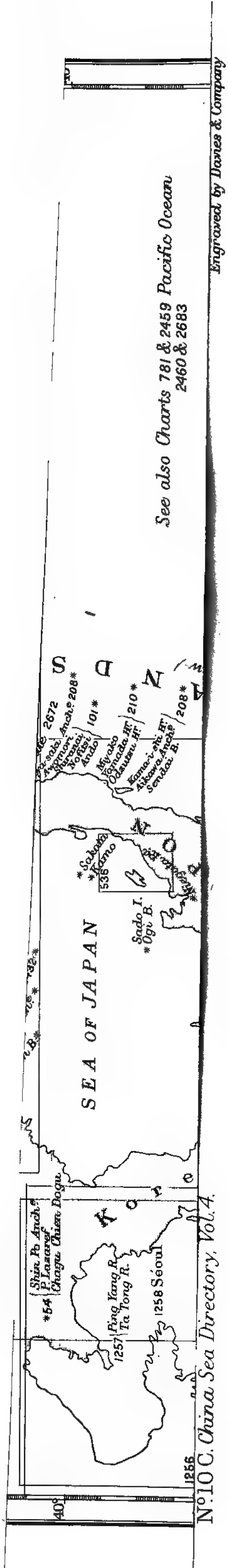

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THE
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Vol. IV.

CHAPTER I.

GENERAL REMARKS—CLIMATE, PREVAILING WINDS AND WEATHER, FOGS, STORMS AND GALES, TYPHOONS — CURRENTS — MAKING PASSAGES.*

THE KOREA, KOREA STRAIT, COAST OF TARTARY, SEA OF JAPAN, GULF OF TARTARY, SEA OF OKHOTSK AND KAMCHATKA.

GENERAL REMARKS.—The **KOREAN** peninsula (*see* page 49) is divided into eight Dō or provinces. One of the remarkable features of the inland physical geography of this peninsula is the irregular chain of well-wooded mountains, extending along its east side from north to south through seven parallels of latitude. Although great differences of climate are found on opposite sides of this range, the climate of the Korea in general is excellent, bracing in the north, and in the south tempered by the sea breezes of summer.

As compared with European countries of the same latitude, Korea is much colder in winter and hotter in summer. Spring and autumn are the most pleasant seasons. During summer, in addition to the great heat, rain often falls in torrents, rendering the roads almost impassable. Toward the end of September storms and variable winds commence.

On the west coast and in the Yellow sea, the following seem to be the usual changes of weather, and the prevailing winds at the different seasons :

Winds.—From January to March, inclusive, N.W. winds prevail, and in January stormy lasting gales from North and N.W. are frequent. On the western shores of the Yellow sea, the wind follows the trend of the coast, and is more to the north and north-eastward.

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* *See* Admiralty Atlas :—Wind and current charts for Pacific, Atlantic, and Indian Oceans, 1879.

From April to June, inclusive, N.E. and easterly winds prevail, which moderate as they haul to the northward, and are accompanied by drizzle; occasionally, however, it blows hard from the N.E. quarter. On the mainland of the Korea the wind is very variable, S.W. winds bringing fine weather, and those from the southward being accompanied by fog.

From July to September, inclusive, the wind is variable, but south-easterly winds prevail, and are generally accompanied by fine weather, sudden heavy squalls and thunder storms being occasionally experienced; the latter end of August and the month of September are very unsettled, being the season when the monsoon changes in the China sea, when northerly winds prevail with rain and very stormy weather.

From August to October the vicinity of cape Shantung is subject to violent squalls, chiefly from the northward, which completely obscure the horizon for a considerable time.

From October to December, inclusive, winds from N.W., North (and N.N.E., on the coast of China), prevail, and in December frequent and heavy gales from the North and N.W. are experienced.

KOREA STRAIT.—In the Korea strait and on the south coast of the Korea, from January to March, inclusive, northerly and north-easterly winds prevail, sometimes north-westerly; they are generally stormy, and North and N.W. gales are of frequent occurrence bringing (in January) snow and sleet.

From April to June, inclusive, northerly, north-easterly, and easterly winds prevail, and are fresh; sometimes increasing to a gale, when from the northward. South-westerly winds sometimes intervene, they are, however, generally light; in the middle of May rain commences and continues in the ratio of two days rain to one without rain, until the end of June.

From July to September, inclusive, north-westerly winds prevail in the strait; they, however, become light and variable with frequent calms, on nearing the coast. (*See* pp. 80 and 109.) Thunder storms are frequent and are very heavy.

From October to December, inclusive, north and north-westerly winds prevail, and are generally fresh; gales may also be expected from the same quarters, bringing snow and sleet, in November and December.

The finest weather is from the middle of August to the middle of November.

Fogs are of frequent occurrence in June.

SEA of JAPAN and EAST COAST of KOREA.—There exists at present but comparatively little information regarding the meteorology of this sea, especially of the East coast of the Korea.

The Russians have surveyed the coast of their territory from the river Amûr to the Tumen ula, but of the prevailing winds and weather in that part of the sea of Japan little is still known. The winds appear very variable, and from the scarcity of observations, and also from the fact that those are somewhat conflicting, the following remarks give only a very general idea of the winds and weather which appear to prevail at the different seasons.

Winds.—According to Krusenstern "North and N.E. winds blow for ten months in the year on the East coast of the Korea, and if sometimes they change to the South during this time, which is rare, it is only for a short time;" this seems to be nearly correct, as N.W., North, and N.E. winds undoubtedly prevail during the greater part of the year on this coast, following the trend in its direction, and blowing through the Korea strait from the north-eastward.

From January to March, inclusive, northerly winds prevail on the Korean coast, hauling to the westward, in the middle of the Japan sea; on the coast of Tartary southerly and south-westerly winds prevail, and on the East coast of the Japan sea westerly and north-westerly winds and calms are experienced.

From April to June,* inclusive, the winds are variable, but light southerly winds prevail, with frequent calms and fine weather, especially between the parallels of 40° and 45° N.; the wind hauls to the eastward on the coast of Japan, and is accompanied by mist, it, however, sometimes freshens to a stormy breeze, with squalls from the north-eastward; generally the weather, however, is fine.

From July to September, inclusive, on the Korean coast moderate northerly winds prevail, with fine weather in September. In the northern part of the sea, fogs and rain last until August, the former generally being dispersed by S.W. winds, and decreasing in density as the summer advances.

During the prosecution of the Russian survey of the coast of Tartary in 1860, the winds were in the months of July and August mostly southerly and easterly, moderate, with clear weather; S.W. winds were rare, as was stormy weather or rain, what little was experienced being of short duration. The temperature was very uniform, and even at an extreme range did not exceed 86° Fahr. In the middle of September the weather changed, the thermometer showing 37° Fahr. in St. Vladmir bay. From the beginning of September the wind blew from N.W. and S.W., and the weather was foggy.†

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* The wind during June was principally strong from East and N.E., veering to S.S.E., when it moderated.—Navigating Lieutenant A. Broad, R.N., H.M.S. *Juno*, 1872.

† Russian Naval Magazine, May 1862.

Fogs prevail from April to June inclusive all over the sea of Japan, especially on the northern coast of Korea and coast of Tartary, and are most dense in June. Hazy weather generally accompanies fresh and extremely cold north-east winds, or light south-westerly breezes. The latter not unfrequently bring on a dense fog, particularly in the northern part of the east coast of Korea; though fogs are as a rule dispersed by a fresh breeze from the south-west.

Snow.—At Vladivostock less snow falls than on the opposite shore of the sea of Japan at the same season, the average number of days on which snow storms occur being only from 15 to 20 against 32 at Niegata, though the temperature at the former place is much lower than at the latter.

Gales.—In the sea of Japan violent squalls occur at all seasons, but more especially in the winter. The appearance of the sky at the point from which they are likely to blow, and the appearance of lightning in the same quarter, generally give warning of their approach. Sometimes, however, they break quite suddenly and are dangerous to a vessel under sail.

It may be remarked that fogs, mist, or hazy weather, generally accompany N.E., East, or S.E. winds, and that winds from N.W., West, or S.W. are certain precursors of fine weather. Gales occur at the equinoxes, generally commencing at S.E. on the coast of Japan, and veering to the southward and westward, excepting when they are associated with a Typhoon, the centres of which as a rule pass south of Japan, when the wind veers from South to S.E., East, and North, generally clearing up at N.W. These latter gales are generally very heavy, and have been known to last three days; they are, however, rare.

From October to December, inclusive, north-westerly winds prevail, and heavy gales are sometimes experienced, generally commencing at South, veering to West, and ceasing at N.W.; they are fierce and of short duration. The weather is generally fine, but easterly wind brings rain and snow; gales of the same description as those occurring from July to September (being the outer limit of a Typhoon) sometimes occur in October, but they are apparently rare.

GULF OF TARTARY.—From cape Disappointment, in lat. 45° 47′ N., the coast of Tartary trends to the north-east, and forms with the west coast of the island of Saghalin, a long channel named the gulf of Tartary, which communicates with the gulf of Amùr to the northward by the strait of Tartary.

The Climate of this, the northern part of the sea of Japan, is in winter very severe, January and February being the coldest months, the thermometer standing at 17° below freezing point in lat. 47° N. The temperature in April and May ranged between 30° and 50°, and during June and July 45° to 60° in Castries bay, and towards the latter end of October it was seldom above freezing point and sometimes as low as 18°. The barometer in May, June, and July 1853, ranged between 29·65 and 30·28, falling once to 29·0 in a heavy south-easterly gale. During winter the barometer is always high, sometimes as high as 30·56 inches.

Winds.—From January to March inclusive, northerly winds are said to prevail, veering from N.E. to N.W., with frequent gales and snow storms. In March the wind hauls to eastward. From April to August, inclusive, the wind is from the southward and eastward, the prevailing winds between April and July being between South and S.E., veering occasionally to E.N.E.; these easterly winds bringing very foggy weather. S.S.W. winds at times intervene, they are moderate and bring fine clear weather; sometimes the S.E. wind is high and squally, and occasionally in May a furious south-easterly gale and snow storm, lasting ten or twelve hours, has been experienced; they may be expected with a previously freshening breeze from the East and S.E., and sometimes a rapidly falling barometer; the wind in these storms rises suddenly and falls equally so, and will most probably veer to the South, S.W., West, and perhaps N.W. Winds from N.W. during this period of the year are of short duration.

In September the wind becomes variable, north-easterly winds being the most prevalent and generally blowing from that quarter round to the N.W., West, and S.W., with fine clear weather after the middle of August, when the fogs, which are almost continuous from March until that time, disappear. About the time of the equinox unsettled weather is experienced and gales are frequent. In October westerly winds predominate, they commence at S.W. but soon haul round to West and ultimately settle at N.W. from which quarter it generally blows strong, gales lasting often two to four days.

In September 1866 a heavy gale was experienced in Castries bay of a revolving character; this gale was the margin of a furious typhoon which was felt as far west as Shanghai, and raged with great violence in the northern part of the China sea, doing great damage at Nagasaki, Yokohama, and Hakodate; these revolving storms however are rarely felt as far north as the gulf of Tartary.

From October to December inclusive, North, N.W., and sometimes N.E. winds prevail, frequent snow storms accompanying winds from the latter quarter. The principal direction of the wind, however, during winter is W.N.W. and N.W.

In the Amúr river, during spring and summer, S.E. and East winds prevail, often accompanied by fog and rain; calms are rare, and westerly winds in summer bring fine weather. In autumn the wind is from West and N.W., generally blowing strong.

At Nikolaevsk, on the Amúr, winds from the eastward and southward prevail, bringing fog and rain. During the autumn months North and North-west winds blow, and during the winter months the direction of the wind is mostly West. At this season, however, N.E. winds sometimes blow, lasting for a considerable period, and are accompanied by heavy falls of snow.

Fogs.—From April to July dense fogs prevail in the gulf of Tartary, interrupted only by a few clear days; June being considered the worst month. According to desultory observations made during the last twenty years, fogs prevail in these months with winds from S.S.E. to East; mist with winds from South to S.S.W.; clear weather with S.W., West, and N.W. winds; and N.E. winds are accompanied by rain.

The inner bays are rarely covered by fogs. After the middle of August clear weather sets in, continuing during the autumn.

Snow storms.—As late as May and again in October heavy snow-storms occur, and continue at intervals throughout the winter.

Ice begins to form in the Amúr river about the middle of October, and rapidly extends southward (continuing until May), and the season for sailing vessels to be in the gulf, on ordinary occasions, must then be considered as having terminated.

Currents.—A branch of the Japan stream (Kuro Siwo) enters the Japan sea through the Korea strait (see p. 37), and continues its course in a north-easterly direction at a rate of 2 to 2½ knots an hour as far as the parallel of 38° N., northward of which it is generally found to be weaker, gradually lessening in force until the strait of Tsugar is approached. Here it splits into two streams, one branch increasing in strength sets to the eastward towards the strait, through which it flows with great velocity (p. 27); the other branch continues its north-easterly course, but with greatly diminished strength, along the west coast of the island of Yezo, and flows into the Pacific through the strait of La Pérouse (p. 29). This current, however, is very variable both in direction and force, and appears to be greatly influenced by the prevailing winds, attaining its greatest force during the season of the south-west monsoon in the China sea; slackening and becoming variable at the change of the moonsoons in the months of April and October; and setting to the southward during the winter months, or season of northerly and westerly winds in the sea of Japan, and of the north-east monsoon in the China sea.

Along the coast of Korea and Tartary it does not however appear to set in one direction, but is governed by the direction of the winds; also with the growth of their force the rapidity of the current increases.*

In the gulf of Tartary, north of La Pérouse strait, there is scarcely any current, the waters in that locality being subjected to tidal influence (see p. 164). The great body of water flowing into it from the Amùr river causes a general set to the southward in the middle of the gulf, but it is scarcely perceptible south of the parallel of 50°; with strong northerly winds, however, it is materially increased, and again with winds from the southward it is not appreciable.

SEA OF OKHOTSK.—This sea is bounded on the North by Russian Tartary, on the West by the island of Saghalin, on the East by the peninsula of Kamchatka, and on the South by the Kuril islands, and, like the sea of Japan, it may be considered land-locked; it is but seldom visited, except by the Russians, who have settlements at various places on its shores; and very little is known of its navigation.

Winds.†—The prevailing winds on its northern and western shores during June, July, and August, are from the southward and eastward, and seldom from any other quarter, moderate, with either fog or rain.

In September, about sunset, the wind, which during the day is from the southward, veers to the westward or north-westward, and remains fresh from that quarter during the night; at about 10 a.m. it moderates, shifting back again to the southward. During the whole of this month the sky is clear, and the wind moderate. About the beginning or middle of September southerly gales are said to be experienced, but this month has in other respects finer weather than August.

From the middle of October to December stormy weather and gales may be expected, with winds from East and S.E.; when the wind is North and N.W., fine weather follows.

From December to April the wind is from North to N.E., fresh, with a clear sky; bringing snow if it hauls to the eastward.

In April and May the winds are moderate, from North during the night and South in the day.

On the south-west coast of Kamchatka westerly winds prevail from September to May, and light easterly winds, variable between N.E. and S.E., and frequent calms are experienced during the summer. In the winter months the westerly winds are frequently very stormy, but in the summer they are generally accompanied by fine weather, while winds from the eastward bring snow and rain. Near the Kuril islands, the winds during the summer months are said to be variable, and it is difficult to determine which are the prevalent quarters; with winds from S.S.E. to S.S.W. the weather is usually foggy, but the haze being dry the sun is often visible through the fog; East and N.E. winds bring rain and bad weather; with the wind from N.N.E. to N.N.W. the weather clears and the temperature is cold; it is also cold with the wind from N.N.W. to W.S.W., and the air is dry and hazy. With the wind between S.S.W. and W.S.W. the sky is clear and fogs are rare.

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* Supplement to Russian Naval Magazine, May 1862.

† From observations at Okhotsk by M. Tessan.

Fogs are nearly constant in the sea of Okhotsk; they are most dense with S.E. or easterly winds, and winds off-shore disperse them.

Currents.—The direction of the currents in this sea is uncertain; but they are found to increase in strength, as the land is approached. Near cape Elizabeth on the north-east coast of Saghalin, and approaching the gulf of Amûr heavy overfalls and ripps occur which appear to be produced by shallow surface currents, and often render a vessel quite unmanageable. This may be naturally expected as the immense body of water from the Amûr river, meeting with the obstruction caused by Saghalin island, effects its escape through the largest outlet or gulf of Amûr, and following the line of coast round the north end of Saghalin island causes, especially with easterly or south-easterly winds, a very dangerous race to form off cape Elizabeth, extending 3 or 4 miles off shore. The current sets strong to the southward along the east coast of Saghalin island, where the sea for some distance off shore is discoloured by it, and joining the easterly current through La Pérouse strait off cape Siretoko, it passes into the Pacific, to the S.E., through the various passages between the Kuril islands; it especially sets with great velocity to the southward through the Yezo strait between Kunashir island and Yezo.

Ice.—The shores of the sea of Okhotsk to a considerable distance are covered with ice from November to April, but the main entrance continues open throughout the year. The open season is of shorter duration in the neighbourhood of the Shantarski islands than at port Aian, the ice about the former in July preventing an approach within some miles.

SOUTH EAST COAST OF KAMCHATKA.—The weather is generally fine at Petropaulski up to the 15th October, but after this period it is wet, and the land begins to be covered with snow which becomes permanent, and lasting through the winter, does not disappear until May or June. In November, December, and January, violent storms are experienced. In fine weather land and sea breezes are experienced, the morning breeze is from North to N.N.W., lasting until about 9 a.m., sometimes until 11 a.m., then shifting to the West and South it sinks altogether in the afternoon, about one or two o'clock; the breeze from the offing sets in, varying from South to East.

Ice.—During winter the cold is severe; snow falls in abundance, and frequently rises as high as the houses; but whatever may be the intensity of the cold, it is rarely the roadstead is entirely frozen over, the ice not generally extending more than a cable's length off shore; and after bad weather, occasioned by winds from seaward, as well as those from West and North, it becomes detached from the land, and is carried out into the road.

In ordinary winters, the coves, bays, and rivers are only blocked up with ice, and then not often too thick to prevent a passage by breaking or cutting.

MARIANA ISLANDS, BONIN ISLANDS, MEIACO-SIMA, LIU-KIU AND LINSCHOTEN ISLANDS.

MARIANA OR LADRONE ISLANDS lie in the region of the north-east trade wind: this trade wind prevails over the group, but between the middle of October and the end of June it may be said to incorporate itself with and become a part of the north-east monsoon, which blows during this season westward of the Mariana islands; this is the fine weather season. The south-west monsoon is, however, felt as far East as the 147° meridian, and these islands come within its influence during the months of July and August; they may be, therefore, said to lie in the boundary between the monsoon region of the China sea, and the trade wind region of the Pacific ocean.

The temperature ranges from 77° to 88°, the barometer attaining a *maximum* height during the winter months of 30·0 inches; the summer *minimum* height being 29·79 in.

From January to March, inclusive, north-easterly winds, veering to the northward, prevail, with variable weather and violent rain squalls in January and February, but in March the weather becomes fine. In April the wind hauls to the eastward as far as E.S.E., and the weather clears up.

From April to June, inclusive, the wind is from the eastward, variable between N.E. and S.E., and if from the southward of east, the weather is generally fine. May and June are the finest months. About the middle of June the wind hauls to the southward.

From July to September, inclusive, the Mariana islands are under the influence of the south-west monsoon, causing variable winds to prevail. At this season the north-east trade wind and the south-west monsoon may be said to contend for the ascendency. From May to July, inclusive, southerly winds, variable between S.E. and West, but principally between South and

S.W. prevail, and frequent calms are experienced, and there is less rain. Strong winds and heavy gales from any quarter are frequent, principally West in August and September; and in July and August it rains heavily at intervals, and thunder storms are of frequent occurrence.

It blows hardest from August to November inclusive.

About the middle of October the wind hauls to the eastward, and continues from between East and N.E. until the end of December. The weather during the latter month is variable, and sometimes heavy gales are experienced; from September to November inclusive, may be said to be the season of bad weather, storms, thunder, and rain, whilst from April to June, inclusive, are the fine months.

Earthquakes are of frequent occurrence in these islands.

Rains occur during the whole of the summer months.

Typhoons are frequently experienced at the Mariana islands. Between the years 1850 and 1875, fifteen hurricanes were felt at Guagan, occurring as follows:—two in February, three in April, one in June, one in September, and eight in November, occurring in the latter month generally between the 12th and 18th. The most violent of these storms occurred on September 23rd, 1855, when it destroyed every wooden house on the island. The storm was accompanied by extraordinary electric disturbances, the barometer falling to 28·30 inches.

Currents.—In the vicinity of the Mariana islands the currents are variable, and are greatly influenced by the prevailing winds. The group, however, as a rule lie in the drift current, resulting from the N.E. trade wind, and the general set is to the S.W. and West, from one to two knots an hour during nine months of the year (October to June); and to the N.E. during the remaining three months.

THE BONIN ISLANDS lie northward of the region of the north-east trade winds, and eastward of the monsoon region, and the climate is said to be remarkably fine. From January to March, inclusive, westerly winds prevail, variable between North and South, with occasional calms, the latter month being showery. In January and February the N.W. and westerly winds often freshen into gales. From April to June easterly winds prevail, variable between N.E. and S.E. with occasional calms. The change from the westerly winds occurs in April, during which month the wind is variable with showers; gales are sometimes experienced in May, generally from S.E. veering to South and West, they are not, however, of frequent occurrence. The weather is fine, but the heat is oppressive, and the atmosphere very damp; winds from the south-west sometimes intervene, especially in June.

From July to September easterly winds prevail, variable round to South and sometimes S.W., with occasional calms. In July and August it rains heavily.

From October to December northerly winds prevail, variable between N.E. and N.W., and sometimes hauling more to the East or West; in December gales are experienced from N.W. and West.*

Fogs are frequent in June, and are especially dense to windward of the islands; in July they are less frequent.

Currents.—The Bonin islands appear to lie between the north-east trade drift current and the Kuro Siwo, in a region of little or no current; these islands, however, probably lie within the limits of the Kuro Siwo during the season of the south-west monsoon in the China sea, when a general set to the eastward and S.E. may be experienced. Amongst the islands the set of the tidal streams is experienced.

BEECHEY GROUP.—The worst winds it is said, may be expected in October, but typhoons are not frequent. During July good weather may be expected, and in August rain; but no heavy storms. In summer, land and sea breezes prevail; and during this season of the year the weather is generally calm; when there is a breeze it is most frequently from the south-west.

MEIACO SIMA GROUP lies in the monsoon region of the China sea, the south-west monsoon blowing from April to September, and the north-east monsoon from October to March.

From January to March, inclusive, N.E. winds prevail, variable between North and East, strong, with haze and rain; in March the monsoon moderates, and occasional calms are experienced.

In April the wind is variable between South and S.E. with unsettled weather.

In May and June S.W. winds prevail, variable round to South.

From July to September S.W. winds prevail, variable round to South and sometimes south-east. In September the monsoon changes, and unsettled weather is experienced during that month; strong variable winds, with squalls and rain.

From October to December, inclusive, the wind is strong from North and N.E., with haze or rain.

Typhoons are experienced from July to October, inclusive, and sometimes in November.

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* From October to April (during the winter months) the prevailing wind is from the westward, variable between S.W. and N.W. with stormy and rainy weather.—Captain Knorr, H.I.M.S. *Hertha*, 1876.

LIU-KIU (LU-CHU) and LINSCHOTEN ISLANDS lie on the edge of the north-east monsoon, but within the limits of the south-west; the climate is mild, the heat and cold being never excessive, and fresh breezes blow all the year round.

From January to March, inclusive, northerly winds prevail, variable between N.W. and N.E.; in March the winds are moderate and variable, and occasional calms are experienced.

In April the wind is variable from the southward and eastward; in May and June the south-west monsoon is steady, moderate, with fine weather.

From July to September, inclusive, south-westerly and southerly winds prevail, sometimes S.E. with squalls and rain. In September the monsoon changes, and the weather is unsettled, and strong winds, squalls, and rain are experienced.

From October to December, inclusive, northerly winds prevail, interrupted occasionally by fresh gales from the N.W. or North, with heavy rain.

During the visit of the United States squadron, in 1854*, the south-west monsoon prevailed steadily in May and June, and veered to the southward and eastward in July. In August the wind was changeable and blew at times quite strong, with squalls and rain. The monsoon changed about the 1st of September.

Between the Lui-kiu islands and the Bonin islands, very boisterous weather is frequently met with.

Currents.—The channels between the Liu-kiu islands are said to be under tidal influence; during the season of the south-west monsoon in the China sea the Kuro Siwo is felt along the west side of these islands, and branching to the eastward through the channels at the rate of 1½ knots an hour.

VAN DIEMEN STRAIT, JAPAN ISLANDS, STRAITS OF TSUGAR AND LA PÉROUSE, YEZO, AND KURIL ISLANDS.

VAN DIEMEN STRAIT, lying between the southern shores of the island of Kiusiu (on the north) and the islands of Kuro sima, Iwo sima, Take sima, Make sima, and Tanega sima (on the south-west and south) has long acquired an unenviable notoriety as being a locality where it is the exception to meet with fine weather; as a fact, however, observations go to prove that in that respect it is not so bad as the neighbourhood of Mikomoto (Rock island) on the south-east coast of Japan.

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* Perry's Japan Expeditions.

Winds.—Northerly winds prevail in Van Diemen strait for nearly eight months of the year; from September to December inclusive they are to the eastward of north (principally N.E.), while from January to March they haul to the westward, north-west being the direction of the prevailing wind. During the summer months the wind is either from the east or west.

Rain.—The average annual rainfall is 52 inches.

Barometer.—The normal height of the barometer is 30·338 inches (in January), falling gradually to 29·920 inches in August.

Currents.—Through Van Diemen strait the waters of the Kuro Siwo or Japan stream set (from west, to east and north-east) with considerable rapidity at all seasons of the year (*see* page 37). To the westward of Sata no misaki a southerly current setting almost continuously out of Kagosima gulf, and attaining a rate of 3¼ knots an hour or even more during spring tides, is felt at varying distances according to the age of the moon, sometimes as far as 5 miles southward from Sata no misaki before it curves round to the eastward through the strait. Westward of the lighthouse on Sata no misaki and along the coast to abreast of Satairas, the flood stream setting to the northward runs at the rate of about 2½ knots at spring tides. Eastward of Sata no misaki the easterly stream gradually curves to the north-east, the main direction of the Kuro Siwo.*

Eddy.—Off Haya saki the stream re-curves in shore and forms an eddy current setting with an average velocity of one to 2 knots an hour, and when easterly winds are prevalent, with greater strength. This eddy current meeting off Sata no misaki the southerly stream from Kagosima gulf, causes heavy tide races and overfalls, which with high winds, would prove dangerous to small vessels falling in with them. The positions of these overfalls and tide rips vary, from close to the cape to some 2 or 3 miles from it, according to the relative strength of the opposing currents. At neap tides the strength of the eddy current is about one knot an hour.

The Kuro Siwo sets through Van Diemen strait with a velocity varying from one to 5 knots an hour; the maximum velocity occurring while the ebb stream is running (by the shore) at spring tides; the current decreasing in strength as the coast of Kiusiu is approached. On ordinary occasions the current runs strongest at about 4 miles north of Tanega sima.

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* "At new moon the current was setting E. by N. 5 knots an hour at 10 miles S. by E. from Kanon saki (in mid-channel). On going from here to Odomari bay the strength of the stream decreased gradually, and when within 3 miles of the land was 2·9 knots an hour; from this it became much weaker and at 1½ miles from the coast there was a slight southerly set."—Commander P. Aldrich, H.M.S. *Sylvia.*

Among the islands to the southward of Kiusiu the currents are, at times, very irregular, varying in velocity from one to 4 knots an hour; during neap tides there is often no appreciable current. The irregularity of the streams in this neighbourhood is no doubt greatly caused by the uneven depths and the many rocks and shoals found to the southward of the islands, which tend to divert the stream. In the vicinity of Make sima and the north end of Tanega sima, the regular tidal streams are experienced, the flood stream setting southward, the ebb northward; but at 4 miles from the land the easterly current is continuous.

JAPAN, SOUTH and EAST COASTS.—The Climate of Japan varies considerably between its southern and northern extremes, the former enjoying almost a tropical climate, the latter almost a Siberian. Speaking generally the summer is short, damp, and hot; and the winter long, comparatively cold, and fine. The transition periods between winter and summer are short in the north, and lengthen more and more towards the south, at the expense of the winter. The almost constantly clear sky and an agreeably mild and invigorating atmosphere, cause the autumn and spring to be the most pleasant time of the year in southern Japan.

Barometer.—From December to February inclusive the mean pressure over the Japan islands varies from 30·10 to 30·30, the lowest isobar in these months being farthest inland, whilst the highest follows the line of coast. In March, April, and May, the pressure is more evenly distributed than at any other period of the year excepting the month of November. The weather during these months is, as might be expected, very fine, though moderate rain falls, increasing in the latter month.

In June, July, and August there is great variation of pressure over the southern portion of Japan, more especially on the south-east coast where the isobars are packed close together showing a very steep gradient, and rain falls. In October, the pressure increases, and much rain falls on the south-east coast. In November the pressure is nearly equalised, and the weather is fine.

The following are the variations of the barometer throughout the year at some of the principal points on the southern portion of the Japan islands:—

At Nagasaki, from October to March the barometer ranges between 30·39 (December) and 30·265 (March), gradually falling to its lowest point 29·923 inches, in July.

At Sata no misaki (the southern point of Japan), the barometer has a much less range, its highest level being 30·338 inches (in January), gradually falling to 29·92 in August.

At Oö Sima (entrance to Kii channel), the barometer attains its highest level 30·37 inches in December, varying little during January and February, and then gradually falling to 29·388 inches in August.

At Mikomoto (Rock island), the barometer stands at 30·30 in February (its highest level), with little variation during the previous months of December and January. From February it falls gradually to 29.481 inches in August.

At Kobé (in the Inland sea), the barometer varies very slightly all the year round, ranging from 30·368 inches in February to 30·033, its lowest level, in August.

At Yokohama, the barometer between October and February ranges from 29·882 inches in the former month, to 30·124 inches in the latter; the pressure gradually decreasing, and the mercury attaining its lowest level, 29·673 inches, in August.

Temperature.—At Nagasaki, in the island of Kiusiu, the weather is very changeable; the average temperature in January being 35°, and in August ranging as high as 98° Fahr. In December and January the ground is covered with hoar frost, and occasionally with snow, except in very mild winters.

The extremes of temperature at Nagasaki are never very great, the cold blast of winter being tempered by the Japan stream, and the high range of the thermometer in summer being compensated by the refreshing sea breeze which blows nearly every day up the entire length of the harbour.* Up to the end of June the thermometer ranges from 62° to 78°. Later on in the summer the heat is greater, and on calm days, excessive; the surface water on one occasion having been registered at 90°. August brings unsettled weather on the coast, with short gales from various quarters, squalls, rain, and frequent calms; November brings the north-west wind, which prevails in the Korea strait and Japan sea during the winter months. There is little actual winter in the south though occasional snow-storms fetch home to the coast in the north-westers. Japan is altogether a healthy climate for Europeans, sickness being comparatively rare; small-pox is, however, at times very prevalent and often epidemic amongst the Japanese.

On the south-east coast the thermometer ranges from 45° in January to 85° in July and August. On the south-west coast it ranges from 43° in January to 86° in July and 85° in August. In the Inland sea it ranges from 37° in February to 86° in July and August. In the Gulf of Yedo it ranges from 37° in January to 80° in August. At Hakodate, from 30° in January to 74° in August.

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* At Nagasaki, in August, a north-easterly beeeze blows from about 2 A.M. till 9 A.M., followed generally by a calm or light airs from north-west until about 3 P.M., when a south-westerly wind sets in and lasts until about 9 P.M.—F. Darbishire, Navigating Lieutenant H.M.S. *Osprey*, 1865.

At Simoda, on the south-east coast of Nipon, the climate is more or less variable in the winter and spring. The presence of snow upon the lofty peaks, although there is seldom frost or snow at Simoda itself, and the not unfrequent rains and fogs, give an occasional humidity and rareness to the atmosphere which must be productive of occasional inflammatory diseases. The change of wind alternates often between the warm sea breezes from the south, and the cold blasts from the snow-capped mountains inland. In summer it is occasionally very hot in the daytime, but the nights are refreshed by the sea breezes. The peak of Fusi yama is only clear of snow during September, and not always then.

At Tokio (Yedo) January and February are the coldest months, and the mean temperature in February is about 37° Fahr.; about the middle of the latter month, the weather which has been very fine but gradually becoming colder during the winter, breaks with rain and snow, and east winds swelling into gales of two or three days' duration, succeed. In March, April, and the middle of May (when the rains commence) the climate is delightful, as it is also in autumn. In summer the maximum temperature in the shade is 86°, ordinarily 80° at noon, and the evenings are cool and pleasant. In the months of July and August, which are the hottest, south winds with a little westing (sea breezes), are prevalent in the gulf, being often very fresh off Yedo, and sometimes lasting during the entire night.

Earthquakes.—The whole region of the Japanese islands is volcanic, and many of the eruptions are frought with extreme danger to ships. At Yedo, an earthquake occurred in August 1783, exceeding in its horrors and widespread desolation that of Lisbon. Another occurred at Yedo on the 10th November 1855 which is said to have caused the destruction of 100,000 dwellings and 54 temples, and the death of 30,000 persons.

In 1854, the town of Simoda was reduced to ruins, and the Russian frigate *Diana* nearly wrecked in the harbour, being whirled many times round her anchors, at one time aground, at another in many fathoms depth. She was then greatly injured and was subsequently lost in an inexplicable submarine tornado, whilst in tow of a multitude of Japanese boats which deserted her suddenly at some (to them) well known warning.

Simabara, in Kiusiu, is also a locality of terrible earthquakes, one of which is said to have altered the whole of the features and coast-line of the neighbouring province.

Rain is frequent throughout the year, and on that account there can hardly be said to be a distinct rainy season in the Japan islands, though from the middle of May to the end of June has been called the rainy season in the south of Japan. Observations, however, show that the southerly monsoon produces two principal periods of rainfall, both of which extend over about six weeks, the one commencing in early June, the other in September. The early summer period of rain commences in May in the extreme south of the Japan islands, and sets in later along the coast northward, until, in Yezo, they are merged with the autumn rains.* The rains generally set in at Nagasaki towards the end of May ; they are heavy and continue about six weeks. The rainy days alternate with dry days, which as the season advances become extremely hot.

At Nagasaki the average annual rainfall is 40 inches, by far the heaviest fall occurring in August, while from May to September about an equal quantity falls monthly. The greatest number of rainy days occur in the months of December, January, February, and August, though in the first three months the quantity is small.

At Sata no misaki the average annual rainfall is 52 inches, the heaviest fall being in August and September.

At Oö Sima (entrance to Kii Channel) the annual rainfall averages 71 inches, the heaviest fall occurring in September and October, while the greatest number of days on which rain falls occur in the months of June and August.

At Simonoseki, observations are too scant to give reliable averages. It would, however, appear that July is a wet month.

At Mikomoto (Rock island) the average yearly rainfall is 61 inches, which is distributed over 114 days. The heaviest fall occurs during October, while the months in which rain falls frequently include January, August, and September.

At Yokohama the average annual rainfall is the heaviest experienced at any of the coast stations at which observations have been made, viz., 85 inches distributed over 117 days. The heaviest falls occur in June, September, and October; but with exception of December, January, and February, rain falls one day in every three throughout the year.

At Hakodate there have been no observations as to quantity of rainfall, but the greatest number of rainy days occur in the months of August, November, and December.

Snow.—The fall of snow on the east coast of Japan is comparatively insignificant. In Tokio it snows on an average on four or five days in January and February, and sometimes in March; and only in rare cases does it remain on the ground for more than two or three days at a time.

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* Professor J. Rein; *See* Annalen der Hydrographie, 1881.

On the west coast, however, north of lat. 35° N. snow falls abundantly, Niegata having on the average 32 days of snow during the winter, and in the open country it lies from 3 to 5 feet deep.

WINDS.—Though there are considerable local variations in the direction of the winds experienced at the different seasons of the year along the extensive sea-board of the Japan islands, the following appear to be the normal changes which occur throughout the year.

Near the coast of Japan by far the average wind throughout the year is from the northward, variable between N.E. and N.W., or off the land, the average wind being N.E.

From January to March inclusive, winds from the northward and westward prevail, shifting occasionally to the north or north-eastward, bringing snow and sleet in January and the beginning of February.

From April to June the winds are light and variable, principally from the northward round to West and sometimes S.W., with frequent calms; the latter end of May and the whole of June is said to be the rainy season on the south and east coasts, the winds are then variable, but haul to the southward towards the middle of June.

From July to September inclusive, southerly winds, variable between S.E. and S.W. prevail, winds from S.E. being more prevalent during August and September than in any other months. The weather is unsettled about the period of the autumnal equinox, and the wind becomes variable, continuing so until the middle of October, but gradually settling to the north-westward, and becomes tolerably steady from that quarter about the latter part of that month. In July thunder-storms are of frequent occurrence.

From October to December, inclusive, northerly winds, from N.W. to N.E., prevail, moderate, with fine weather; a bright day with a clear sky being generally a sign of a strong N.W. wind. With a fresh wind from N.E. during these months rain or snow falls, the latter only in December, but occasionally a N.E. wind freshens into a gale. November is usually a wet month on the east coast, and rain falls at intervals throughout the winter months.

From November until May local gales blow down the numerous channels and gulfs, especially in the Boungo and Kii channels, and the gulfs of Owari, Suruga, and Yedo; these winds blow fiercely for from 3 to 36 hours, frequently lulling or altogether subsiding at the sun's or moon's setting. During the winter, winds from the N.E. most frequently bring rain; from the N.W. bright clear weather; from S.E., South, or S.W., a cloudy sky, and often rain.

EAST COAST OF JAPAN ISLANDS.*—The prevailing winds during the winter months (November to March) are between North and West (off the land). If the barometer rises much above 30·011 in. easterly winds may be expected lasting from 24 to 48 hours, and accompanied by fine weather; the barometer then falls and the weather changes, the wind becoming variable accompanied by rain. Should the wind veer "against the sun" through North and N.W., and the barometer fall to 29·607 inches a westerly gale may with certainty be expected.

Easterly gales set in with a high barometer and very cold weather, the barometer remaining stationary during the gale until the wind veers to N.E., when, should the barometer then fall, more bad weather may be expected. When easterly gales occur at the periods of full or change of the moon, they are usually very violent, and a heavy sea gets up on the coast.

Northward of Kingkasan, towards Tsugar strait, easterly winds hang to the E.S.E. bringing thick weather, snow, and rain; and snow-storms are of frequent occurrence on this part of the coast.

As a rule the barometer falls before westerly gales set in, and rises before easterly gales appear.

Towards the end of March the westerly winds decrease both in force and frequency; and during April and May the weather is fine, with light variable winds.

The winds during the summer months including September, are chiefly from between South and East, the latter being accompanied by rain.

Fogs are experienced all along the east coast at this season (June to August inclusive) and are especially dense northward of Kingkasan; on the south-eastern shore they are, however, neither so thick nor so frequent as on the north-eastern coasts.

During October the weather is changeable, winds from north and west, however, preponderate.

EAST COAST—Gulf of Yedo.—During the spring and summer months in the gulf of Yedo, very violent and sudden squalls from the north come on frequently without any warning, from almost a calm or perhaps a light air from the S.W. Vessels passing between Yokohama and Hakodate report having experienced the same at this season, and have met with loss of spars and sails in consequence.†

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* The following local particulars relating to the winds and weather experienced on the several parts of the Japan coasts, are principally abridged from a paper on the meteorology of Japan by the late Captain Kleinmann, and are, it is said, "the result of many "years' observations made by expert mariners, well acquainted with the local "peculiarities of the Japanese coasts."—Annalen der Hydrographie, Heft 2, 1881.

† Captain C. S. Stanhope, H.M.S. *Ocean*, 1868.

After March, changeable, unsettled, hazy weather continues for some time.

In the spring and summer months westerly winds are generally experienced between Siwo misaki (at entrance to the Kii channel) and Mikomoto (Rock island), on passing which, the westerly wind falls, and a N.E. wind is often found blowing strong down the gulf of Yedo.

Fogs.—In the early part of July fogs are experienced along the whole of this coast, accompanying calms and light east winds (chiefly from the southward of East), but the fogs are not generally found so thick in-shore as to render navigation dangerous, nor to prevent the recognition of the land. Within one or two miles of the shore the fog frequently lifts and the land is then plainly visible.

In the latter part of July fogs were only experienced between lat. 36° N. and lat. 37° N.; fine weather with land and sea breezes prevailing. Northward of 38° N. stiff breezes from west lasted a few hours.

On the south-east coast the fogs become modified when in contiguity with the warm water of the Japan stream, and form into detached banks or clouds which hang over sea and land, obscuring the hills almost to their bases. A strong S.W. wind also may here be met with, when a light east wind or calm is prevailing on the east coast.*

WEST COAST OF NIPON.—During the winter months, strong West and North-west winds prevail and blow strong almost without interruption, a lull only occurring, sometimes, at full or change of the moon. These winds blowing so continuously produce a very high sea all along the western coast of the Japan islands.

Gales set in generally with but little warning, the only prognostic being a heavy swell; they are as a rule accompanied by heavy snow-storms and last from 24 to 48 hours. After fine weather has lasted from 24 to 36 hours the wind usually hauls to the eastward of North, and the barometer rises very high, followed by a sudden light fall of snow, the wind then veering to the southward, and afterwards to the westward, snow falling heavily. The barometer also falls quickly and the gale commences from south-west accompanied by blinding snowstorms; the wind occasionally continuing for some time in this quarter, but it may be expected at any moment to veer suddenly to North-west in a heavy squall; the gale then continues to blow in furious squalls alternating from N.W. to S.W. As the gale goes down the wind veers with the sun through North and East, the barometer rises quickly, and fine weather may again be expected to last from 24 to 36 hours; but if the wind backs especially heavy weather is in prospect.

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* Commander C. Bullock, R.N.

Towards April the weather becomes finer; May brings easterly winds, with rain, and the summer is very wet, much more rain being said to fall on the west than on the east coast. The prevailing winds during these months are from South and S.W., and the weather is fine.

During the summer months South and S.W. winds predominate, but the winds at this season are very changeable, and often after fine, hot, days, blow as land and sea breezes, off the land during the night. S.W. winds occur chiefly at the beginning and end of summer.

Southward of Sado island the weather is less boisterous, and altogether milder.

Fogs occur on the west coast of Nipon as on the east coast, during the summer months, increasing in frequency and density as Tsugar strait is approached, but they are never so heavy, nor do they last so long as on the east coast.

Snow falls very heavily during the winter months, especially between Fushiki and Tsugar strait.

Typhoons are not frequent on the northern part of the west coast, sometimes two or three years elapsing without any being experienced; they are said also to be less dangerous here than on the east or south coasts.

SOUTH-WEST COAST.—During the winter months N.W. and westerly winds prevail, and often blow with great violence accompanied by snow, hail, or rain, and a heavy sea.

A strong S.E. wind, with much rain and a falling barometer, is a forerunner of a westerly gale with clear weather.

In the summer East and S.E. winds prevail, with thick and rainy weather; June and July bringing fogs which, however, are not so dense as those on the west and north-west coast, neither do they occur so frequently.

During the months of September and October, and also the early part of November, S.E. and S.W. gales sometimes occur (accompanied by heavy showers of rain), which are especially violent in the neighbourhood of Ikutski and Hirado.

During January and February northerly winds with snowstorms occur with a falling barometer. Thus at this season of the year the west coast of the Japan islands is a lee coast, and the violence of the prevailing N.W. and westerly gales admits only of powerful steamers navigating this coast, with any security, during the winter season. Vessels bound northwards at this time of the year would do well to keep along the Tartary shore of the Japan sea, where a smoother sea and finer weather will be experienced than on the Japan coast.

In the following table, the principal meteorological features which characterise each month of the year on the east and west coasts of the Japan islands, south of lat. 34° N., are summarised.

Month.	Normal		Temperature of Sea at								Prevailing Wind.	REMARKS.
	Reading of Barometer.	Temperature of Atmosphere.	S.E. Coast.	Inuboye Saki.	Kingka-san.	Nambu.	Tsugar Strait.	Hirado sima.	Me sima to Yangtse.	W. C. Kiusiu.		
	in.	°	°	°	°	°	°	°	°	°		
January	30·151	43½	63	48	45½	—	50	48½	60	55	Between North and West.	When the barometer falls below its normal reading northerly and westerly winds may be expected, and should it fall as low as 29·764 inches, a strong westerly gale will in all probability follow. If it rises with the setting in of the gale it often blows with great violence from that direction and continues even when the normal level has again been reached. If the weather has continued fine for some days, and the barometer then rises considerably above the normal reading, light easterly winds, generally accompanied by rain, may be expected.
	During this month the bar. is at its *maximum* level. the ther. is at its *minimum* height.											
February	30·119	47½	60	58	45 to 50	—	42	50	60	—	Between North and West.	The temperature of the sea is at its *minimum*. The wind is stronger than in January, which makes the cold appear greater than it really is. Strong E.N.E. gales sometimes occur with a high barometer, but they never last long, especially when the barometer falls, which, as in January, is a precursor of westerly winds.
March	30·099	53½	Temperature of sea as in Feb.							-	Between North and West.	The north-west winds blow very hard at times. Heavy S.W. winds with a falling barometer occasionally occur; when these have abated the wind veers to West and N.W. and the barometer rises gradually. Easterly and south-easterly winds also begin to appear, and are accompanied by rain, the barometer remaining at its normal height, but these winds are almost immediately followed by a westerly wind which influences the barometer but slightly. The weather as a rule is very changeable in March.
April	30·099	53½	Temperature of sea equable at 60° all over Japan coasts.								—	The weather is changeable and rainy, the winter now disappearing. As many South and S.W. winds occur as North and West, and East and E.N.E. winds are more frequent. A fall of the barometer during this month may indicate wind from the southward between S.W. and S.S.E. Towards the end of April the north-east monsoon in the China Sea loses its force, and this circumstance in all probability affects the weather on the Japan coasts. In the Seto Uchi, and on the west coast of Kiusiu, frequent fogs occur, as also on the coast westward of Yokohama; but they are of short duration. Towards the end of the month fogs appear in the northern part of Japan.
May	29·920	66	66	65	62	49	45	—	63	59	N. & N.E. and S. & S.W.	The temperature of the sea quickly rises and the Kuro Siwo increases its velocity. Northerly and southerly winds blow with equal regularity. If the barometer falls below the normal reading South and S.W. winds are in prospect. Gales from N.E. or N.W. occur during this month.

Month.	Normal		Temperature of Sea at								Prevailing Wind.	Remarks.
	Reading of Barometer.	Temperature of Atmosphere.	S.E. Coast.	Inuboye Saki.	Kingka-san.	Nambu.	Tsugar Strait.	Hirado sima.	Me sima to Yangtse.	W. C. Kiusiu.		
	in.	°	°	°	°	°	°	°	°	°		
June -	29·862	74	78	70	68	56	60	—	72	71	Southerly and Westerly.	The month of June is distinguished by the uniformity of the temperature of both atmosphere and sea. The weather is generally fine. The Kuro Siwo has considerably increased its velocity and temperature, consequent on the S.W. monsoon, which has now fully set in, in the China Sea.
July -	29·832	80	77	77	70	68	72	—	76	76	South-westerly and Easterly.	Fine weather prevails and the barometer is steady. South, S.W., and Easterly winds, occur most frequently.
August -	29·83	80	81½	77	68		71	—	82	79	Southerly between S.W. and S.S.E.	The barometer has now reached its *minimum* level, and the temperature of atmosphere its *maximum*. East and West winds now occur occasionally, though southerly winds still predominate; fine weather and light winds being frequent. The barometer below its normal reading indicates South and S.W. winds, while North and N.E. winds with fine weather generally follow a high barometer. Easterly gales occur during this month, and Typhoons may also be expected.
Sept. -	29·90	75	80	73	72	71	76	—	—	78	Southerly between S.W. and S.E.	Northerly winds occur now more frequently, though southerly winds still predominate, and while the temperature of the atmosphere decreases rapidly during the month the atmospheric pressure increases. Typhoons may occur.
October -	30·001	65	70	68	66	60	70	—	69	68	Northerly and Westerly.	Northerly and westerly winds now preponderate: occasional gales from N.E. and East may still be expected until the monsoon in the China sea has entirely changed. Although as a rule fine weather prevails during this month, there have been years when October has been very stormy. The N.W. winds generally begin to set in with a gale of some duration, which sometimes commences at S.E. and veers to N.W. (through North); after this has occurred the winter may be said to have commenced. Typhoons very frequently occur between the 1st and 10th of this month. The barometer falling much below the normal reading indicates a westerly gale, and an unusually high barometer an easterly wind. S.E. winds are rare and of short duration.
November	30·099	60	68	65	59	58	67	—	66	64	Northerly and Westerly.	November is generally a stormy month, strong N.E. winds with heavy showers of rain and a high barometer being not unfrequent, but they rarely exceed force 7 of Beaufort's scale and last only 24 hours. While these rain squalls occur at sea snow falls on the mountains. Occasionally light South or S.E. winds accompanied by fine weather set in and lasts a few days. A high barometer indicates easterly wind which during the winter months is accompanied by much rain.

Month.	Normal		Temperature of Sea at								Prevailing Wind.	REMARKS.
	Reading of Barometer.	Temperature of Atmosphere.	S.E. Coast.	Inuboye Saki.	Kingka-san.	Nambu.	Tsugar Strait.	Hirado-sima.	Me sima to Yangtse.	W. C. Kiusiu.		
	in.	°	°	°	°	°	°	°	°	°		
Nov.—*continued*												East wind with rain and a falling barometer (below normal reading) indicates that the wind will veer to the westward, and the weather will then clear up, the westerly wind blowing strong; the barometer then rises and fine weather may be again expected for a few days.
Dec. -	30·111	53	66	59	48	55	56	—	65	63	North and N.E., also N.W.	December is also a stormy month, the wind being generally strong (force 4 to 7) with unpleasantly cold and rainy weather. If the barometer falls below the normal reading, Westerly winds (or N.W.) may be expected, and the lower the barometer the sooner, and stronger, will the wind blow from that direction.

In the SETO UCHI (Inland sea) little rain falls, the high land of the island of Sikok, and the almost as mountainous country of Nipon, forming a great barrier to rain and bad weather generally; July is, however, the rainy month. At Kobe the average rainfall is 38 inches, the rains being heaviest from August to October.

North-westerly winds prevail in the Seto Uchi throughout the winter months, with dry, clear, and bright weather. After March unsettled weather with haze and occasional rain continues for a short time; and in the summer months light variable winds, principally from the N.E. and S.W., with frequent calms are experienced. In the winter the north-westerly winds, which are fresh throughout the day, often lull at sunset. An easterly wind at this season is generally accompanied by rain. During the summer months land and sea breezes are experienced at Kobé and Ōsaka.

At the time of the equinoxes gales occur, which sometimes hang to the south-west for a day or two, but they are not dangerous. They almost invariably veer with the sun, and blow hardest from the north-west.

GALES.—Ordinary gales occur frequently throughout the year, they spring up sometimes very suddenly, their prevailing direction being from the southward, between S.E. and S.W. (from seaward). In the winter months, near the coast, gales from N.E., S.W., and West are often experienced.

The barometer generally rises previous to a gale from the northward, and if it fall after a strong N.E. wind has set in, bad weather will follow. Before a southerly gale the barometer falls. Very frequently a long heavy swell rolls in from the southward some time before any wind is felt. Such a swell with a falling barometer is a certain prognostication of a coming gale.* In the Seto Uchi (Inland sea) gales occur at the equinoxes, sometimes blowing hard, from S.W., for a day or two. The shift of wind in these gales is almost invariably "with the sun" and blowing hardest from West to North.

The worst weather experienced in the southern portion of the Japan islands is met with off Mikomoto (Rock island); the average number of gales occurring yearly (observed during the years 1871–74) was 27, sixteen of which occurred during the months of August and September. Sata no misaki (cape Chichakoff) has the reputation of being a locality where very bad weather is met with, but the meteorological records show that the average number of gales occurring there yearly, is below that of Nagasaki and Oö Sima (Kii channel). The strong current, heavy sea, and murky atmosphere so often met with off this cape, however, combine to make its vicinity notoriously perilous in bad weather.

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* Off Yedo, in February 1863, H.M.S. *Swallow* experienced a sharp gale of ten hours' duration, with little or no warning. The sky was very clear, with steady falling barometer, and in two hours the ship was reduced to close-reefed main topsail, &c. In the months of August and September 1858, H.M.S. *Furious* experienced heavy gales from E.N.E. shifting round to the southward and westward.

The following TABLE showing the prevailing Winds for each Month throughout the Year at different Places on the South-west, South, and East coast of Japan, and in the Seto Uchi, is deduced from Observations recorded in the Meteorological Registers kept at the several Lighthouses and Light-vessels between the years 1871–1874.

Month.	Locality.							Seto Uchi (Inland Sea.)		
	Simonoseki.	Nagasaki.	Sata-no-misaki.	Siwo misaki.	Mikomoto (Rock island.)	Sagami misaki.	Yokohama.	Tsuri sima.	Nabe sima.	Hiogo and Kobe.
January -	North and North-west.	Northerly from N.W. to N.E.	North and North-west.	North-west	Westerly	Northerly and Easterly.	Northerly	North-east	Northerly	North-west
February -	North-west	Northerly from N.W. to N.E.	North and North-west.	North-west	North-east and Westerly.	Northerly and North-east.	Northerly	North and N.E.	North and West.	N.W. and West.
March -	South and South-east.	North and N.E.	North-west.	North and North-west.	N.E.	North and N.E.	North	N.E.	Northerly N.E. to N.W.	North-west and West.
April -	S.E. and E.	Northerly from E. to N.W.	North-west and Easterly.	N.E. and Westerly.	N.E. and West.	N. N.E., and S.W.	North and Southerly.	N.E. and South.	N.E. and West.	North and S.S.E.
May -	S.E.	E. and N.W.	E. and N.W.	E. and N.E.	N.E.	N. and N.E. S. and S.W.	N. and N.E. S. and S.W.	N.E.	N.E.	Southerly from E. to W.
June -	E.	East, S.S.E. and N.N.W.	E.	N.E. and E. Westerly.	N.E.	N. and N.E. S. and S.W.	S. and S.W.	N.E. and S.W.	E.	Southerly from E. to W.
July -	S.E. and S.	S. and S.W.	E. and W.	N.E. and W.	W. and S.W., and N.E.	S. and S.W.	S.S.W.	N.E. and S.	E. and Calms West.	Southerly from E. to W.
August -	E.	Southerly from E. to S.W.	E. and W.	South to W.	S.W.	S.	S.	N.E. and S.	E. and Calms.	Southerly E. to W.
September	North N.E. and E.	N.E.	North to East.	Northerly, N.E. to E.	N.E.	N. and N.E.	N. and N.E.	E. and N.E.	Northerly N.E. and Calms.	E. and W.
October -	E.	East, North, and N.W.	North to East.	N. and N.E.	N.E.	N. and N.E.	N. and N.E.	N.E.	E.	E.
November-	North-westerly.	Northerly N.E. to N.W.	N. and N.E.	Northerly, N.E. to N.W.	N.E. and W.	N.E.	N.	—	Calms.	N. and N.E.
December-	North-westerly.	North and N.E.	Northerly, E. to N.W.	N.W. and W.	N.E.	N.E.	N.	N.E. and S.W.	N.W.	W.N.W.

STRAIT OF TSUGAR.—Strong N.W. winds prevail in this strait during the winter months, accompanied by snow and rain, and the weather is very boisterous. In April the wind hauls to the westward, with heavy squalls from the S.W. In May the wind is from the southward, variable between S.W. and S.E. (sometimes more easterly or westerly), and fine weather commences, lasting until the middle of September, when the weather becomes unsettled and summer commences to break up with frequent gales; winter fairly setting in in October.

During H.M.S. *Saracen's* survey of the strait of Tsugar, May, June, July, and August 1855, the prevailing winds were from the South, with much fine clear weather. The wind was less frequent from the N.W. than any other quarter.

The wind in shifting usually followed the course of the sun. After a few day of light southerly wind and fine weather it freshened, and veered to the westward, accompanied by fine clear and cold weather. At N.W. it usually died away, or flew round suddenly to the eastward; in the latter case it was always followed by a dense fog or a gale the weather becoming again fine as the wind veered to the southward.

Fogs.—Dense fogs prevailed in May and June; after that period they are comparatively rare.

Current.—Through the middle of Tsugar strait the current sets constantly to the north-eastward, but its breadth varies considerably according to the state of the wind and weather. Its usual rate is from 2 to 2½ knots an hour, but with westerly or south-westerly winds it increases greatly in velocity and volume, filling up two-thirds of the channel, and under these circumstances it often attains a rate of 4 to 5 knots an hour. With strong winds from East or N.E. it diminishes greatly both in strength and dimensions. The shores of the strait are subject to tidal influence, the flood making to the eastward and the ebb to the westward; the velocity of the whole stream, on the flood tide being thus considerably augmented; whilst on the ebb it is diminished.

YEZO ISLAND.—**The Climate** of Yezo is severe (almost Siberian*), and is very trying to the health in consequence of the great variability of atmosphere, thaws and sharp frosts alternating. The winter commences about the middle of September, when snow † appears on the tops of the mountains reaching the lower ground in October, and lasting until the end of May in the south, and until the first week in June in the northern parts of the island. There appears to be no spring, the summer coming immediately on the disappearance of the snow, and he country is green in a few days, so sudden is the transition that it seems almost incredible.

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* Sir R. Alcock.

† During the winter of 1859, snow fell, at Hakodate, daily without intermission for six weeks.—Captain T. Blakiston, R.A., H.M. Consul at Hakodate.

At Hakodate, January and February are the coldest months, while March differs little from December. July, August, and September are the warmest months, the decrease of temperature after September being usually sudden. The spring is protracted and cold. The barometer is highest in October and November, and the most rain falls in July and August during easterly winds. The most snow falls in December and January. North-west winds set in the latter part of October and continue until March. S.W. winds prevail in April; South in May; S.E. in June; and East in July and August; the wind gradually veering round during spring and summer from S.W., round by South, to East, suddenly flying back again to West at the autumnal equinox. North winds seldom blow at Hakodate, and never for any length of time, while N.E. winds are rare. The break up of the warm weather at the end of August or early part of September is usually accompanied by one or more typhoons, the centres of which invariably pass westward of Hakodate. It is therefore evident that those typhoons are only experienced at Hakodate, which having re-curved somewhere to the southward are travelling to the north-east over the Japan islands.

Towards the middle of September the summer in Yezo begins to break, and soon disappears. Frosts set in, and snow falls on the higher ranges about the end of the month, and ice forms in large patches in Yezo strait by December. During the winter there are long continued and heavy falls of snow, the thermometer standing at considerably below zero.

The western shores of the island are washed by the warm waters of the Kuro Siwo flowing northward through the Korea strait; whilst the eastern coast comes in contact with the cold arctic stream from the north (*see* page 40); the temperature of the former in the month of May being over 50°, whilst that of the latter is 37°; this naturally causes a marked contrast in the fertility of these coasts, the western shores being well-wooded, and the soil favourable for cultivation, whilst on the eastern coast the increased severity of its climate and longer duration of winter, renders the soil unfit for agricultural purposes, and causes the wood to be comparatively stunted in its growth.

In April the maximum temperature is 67°, and the minimum 28°. In May the max. 71°, min. 30°. In June max. 87°, min. 37°. In July, max. 87°, min. 54°. In August, max. 90°, min. 52°.

Rain appears to fall at intervals throughout the year.

Winds.—From January to March the wind is westerly from North to S.W., but strong N.W. winds prevail, and the ground is covered with snow. April is very unsettled, N.W. winds prevail, and snow still lies on the ground, and falls frequently until the middle of May when the wind hauls to the southward, and it rapidly disappears. Southerly winds, variable between West and East, with occasional calms, prevail until the end of June, and gales are not unfrequent. In July and August, light variable winds from the southward between S.W. and S.E., with occasional calms and fine weather, are experienced. In September the weather becomes unsettled, and gales are of frequent occurrence.

During the winter months westerly and north-westerly winds are said to blow almost continually, and usually with great violence.

On the South and East coasts, winds from S.W. round seaward to N.E. bring fog almost without exception, whilst those off the land or from West to N.E. are accompanied by fine weather.

" Snow falls at the end of October, attaining a depth of two feet all over the ground during the winter ; it disappears by May. The ground is frozen hard to a depth of two feet, and remains so up to June, and the sea freezes a long way out."

Fogs make their appearance early in June, increasing in density and duration until August, about the latter part of which month they gradually disappear.

" Fog is constant all the summer, so much so in June, July, and August that the sun is not seen for frequently three weeks at a time."*

LA PÉROUSE STRAIT.—The winds at the different seasons in this strait are in their general conditions identical with those experienced in the gulf of Tartary, (p. 4) ; there is no information regarding any local particulars, except that during the autumn months (September and October) heavy gales from the westward are of frequent occurrence, and that during the summer months fogs are prevalent.

Current.—In the middle of the strait the current sets to the southeastward at the rate of about 1½ knots an hour, and sometimes from 2 to 3 knots ; near the shore it is regulated by and united with the tides, and consequently varies both in direction and force. The flood stream sets to the eastward through the straits, at which time the whole stream in the strait sets in that direction, and is considerably augmented in its rate, sometimes attaining a velocity of from 4 to 5 knots an hour. Both in velocity and direction, it is also much influenced by prevailing winds.

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* Notes of the Japanese governor at Nemero. These remarks have been compiled principally from Captain H. C. St. John's report on the climate, &c. of Yezo, during H.M.S. *Sylvia's* visit in 1871, and from that of Captain Blakiston, R.A., 1871.

KURIL ISLANDS (PACIFIC COAST).—Little is known of the climate or meteorology of this locality, the islands are however said to be constantly enveloped in fog, rendering navigation in their vicinity extremely dangerous. From January to March northerly and north-westerly winds are said to prevail, and throughout the winter much heavy weather with frequent strong gales accompanied by snow and sleet are experienced.

From April to June, inclusive, south-easterly winds prevail with frequent calms. From July to September, winds from the southward variable between West and East prevail, with occasional calms.

Westerly winds set in in September and prevail principally from North-west, from which quarter they blow violently throughout the winter months, accompanied frequently by snow and sleet.

Fogs prevail throughout the year, and are most dense in July and August.

Currents.—In the strait of Yezo (between Yezo island and Kunashir) the current sets constantly to the southward with great velocity, adding considerably to the already numerous dangers experienced in the navigation of this strait. Russian vessels of war always pass through the Pico channel, between the islands of Kunashir and Iturup : from this fact it may be inferred that it is less influenced by currents,* and that its navigation is easy; but little is known, however, of the different channels between the numerous islands forming the Kuril group, though violent currents are said to be experienced in all of them.

TYPHOONS.†—The whole of the western portion of the North Pacific ocean between the parallels of 10° N. and 45° N., together with the China sea, is subject to violent storms, termed typhoons, which, between the parallels of 20° N. and 45° N., are experienced from June to November inclusive, more particularly about the autumnal equinox, especially if the moon be in perigee, or if change of the moon, coincide with the equinox.

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* Commander H. C. St. John, R.N.

† *See* Remarks on Revolving Storms—published by the Admiralty, 1883.

The paths which the centres of these storms describe during their progress sometimes lie to the South and East of the Japan islands, and at other times to the West and North. Japan is commonly visited by the most devastating typhoons when the path of the storm is pursuing a north-easterly course after having re-curved. This re-curvature of the storm's path from the direction in which it has been travelling (usually W.N.W.) to a direction nearly at right angles to its former course, almost invariably occurs when the centre passes out of tropical limits. The southern and eastern shores of Japan are, however, sometimes visited by typhoons when they are travelling from south-east to north-west, as also when pursuing a direct northerly course (while re-curving); but these latter occur less frequently. The paths of the centres of these storms sometimes reach to the north-west of Japan, passing over the southern portion of the Japan islands causing immense damage, and often sweeping houses, trees, and soil, completely away.*

These storms have a progressive, and rotatory motion (*i.e.* they gyrate or blow in a circle of greater or less diameter), they travel from east-south-east to west-north-west, the limits of the storm being then confined within a comparatively small area, which apparently is retained during its progress in this direction (within the tropics). As the south-west monsoon retires and the north-east monsoon sets in, (in September and October,) these storms recurve on the southern edge of the advancing monsoon, and travel from south-west to north-east; it is when pursuing this course that they gradually expand and extend over a considerable area, while they lessen in violence as they progress northward.†

In the tropics, where the barometer varies so slightly under ordinary circumstances that any fall greater than ·35 in. is a sure sign of an atmospheric disturbance, the prognostics are evident; but in more temperate latitudes where the barometer varies considerably with no apparent atmospheric change, the prognostics are less certain. In Japan, the barometer during the months of September and October varies between 29·90 in. and 30·0 in.; but when it remains very steady, with an increase of oppressive heat above the mean temperature, and when this is accompanied by a threatening aspect of the sky, a misty halo round the sun or moon, lurid clouds tufted in shape, a heavy bank of leaden-coloured clouds in the horizon, lightning, and frequently a long, heavy, ocean swell, then a typhoon may be confidently expected.

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* *See* notes, and paths of Typhoons on Wind Charts in Admiralty Atlas.

† A remarkable feature of these storms is their increasing violence in the neighbourhood of their centre or vortex; and as this is approached (unless on the direct line of its own progressive motion) the more rapid become the changes of the wind, which at length instead of veering point by point, now flies round at once to the opposite point.

In the practical application of the theory of revolving storms it must be borne in mind that, although the region and season of the year would render the seaman extremely cautious, yet every strong gale met with must not, especially in extra tropical regions, be at once assumed as cyclonic. The barometer should be closely watched, and a decided fall of ·3 inches from the normal average should be experienced before the conclusion is arrived at that the vessel is within the influence of a cyclone.

When within the limits of the storm it is necessary to ascertain first the position of the ship with regard to the centre, and then the direction in which the storm is advancing.

The rotation of these storms in the northern hemisphere is "against the hands of a watch," hence different portions of the storm have each their own peculiar winds; from this fact a simple rule is deduced by which the bearing of the storm's centre from the ship may be determined, viz.:—Note the direction of the wind at the commencement of the storm, the centre (in the northern hemisphere) will then bear 8 points to the right; for instance, the direction of the wind at the ship being S.E., the centre will bear from the ship S.W.

The region in which a revolving storm blows is divided by the path its axis describes as it progresses into two parts, and if the observer face the direction in which the storm is advancing, the shift of wind, as observed at a stationary point on the left, will be in the opposite direction to that on the right of the path. On the right side of the path the wind veers with the hands of a watch, whilst on the left it veers against the hands of a watch. By observing, therefore, the direction in which the wind shifts, the position of the ship in the storm is at once known (*i.e.* right or left of the path), and this together with the already determined bearing of the centre will indicate the direction in which the storm is progressing, thus,—when the ship's position has been ascertained to lie on the right hand side of the storm's path, and the bearing of the centre of the storm shifts from S.W. through West, to N.W. and North the storm is travelling to the north-eastward; but if the bearing of the centre shift from N.E. through East, to S.E. and South, the storm is travelling to the west or north-westward. If it has been determined that she lie on the left-hand side, and the bearing of the storms centre shift from S.W. through South to S.E. and

N.E., the storm is progressing to the north-eastward; if, however, it should shift from N.E. through North, to N.W. and West, the storm is travelling to the west or north-westward.

For a correct deduction of the ship's position with regard to the storm's path it is essential that the ship be as nearly as possible stationary; for if a ship be scudding in the same direction and as fast or faster than the storm is travelling, the wind may shift in a direction exactly opposite to that which would have been observed had the ship been stationary, or at least may undergo considerable modification, and an erroneous conclusion as to her position in the storm might be drawn. The advisability of heaving-to on the first approach of a typhoon cannot therefore be too strongly urged.

We have now to consider how a ship should be handled when overtaken by a typhoon, so as to escape from its path as quickly as possible. Remembering that the wind shifts in opposite directions on either side of the storm's path, it is essential that if the ship be hove-to she should be placed on that tack on which she would come up as the wind shifts, and if not so placed she will be in constant danger of being taken aback; therefore, when the ship is on the right-hand side of the storm's path she should be hove-to on the starboard tack, and if on the left on the port tack.

If a line be drawn through the centre of the storm, perpendicular to its path and dividing its area into quadrants, it will be seen that (still looking in the same direction in which the storm is progressing) the right-hand quadrant will be that in which the ship cannot get farther from the storm by sailing on, for she would by so doing either cross the storm's path, or travel in the same direction with it, and thus remain for some considerable time within the storm's limits; she must therefore, when in this position, be invariably hove-to on the starboard tack.

In the left-hand quadrant the ship may, however, get farther away by running before the wind.

If the wind be found to continue long in the same direction, and increase in violence, it may be presumed that the ship lies in the direct path of the storm's centre; and if this be succeeded by a short interval of calm (the barometer having been at its lowest, now commencing to rise very slowly) followed by a sudden and violent wind from the opposite quarter indicates that the centre of the storm has passed over the ship.

The quadrants lying behind the storm's centre are not dangerous as the storm is momentarily increasing its distance from the ship.

The following table, taken from Professor Dove's Law of Storms, gives in detail how a ship should be handled under any circumstances in a typhoon in the Northern hemisphere.

	Direction of wind at the beginning of storm.	Bearing of the centre from the Ship.	Shift of wind.	Corresponding course to be held.	Shift of wind.	Course to be held.
1	N.W.	N.E.	N.W. towards W.	S.E. Or heave-to on the port tack.	N.W. towards N.	Ship to be hove-to on the starboard tack.
2	N.W. by N.	N.E. by E.	N.W. by N. „ W.	S.E. by S.	N.W. by N. „ N.	
3	N.N.W.	E.N.E.	N.N.W. „ W.	S.S.E.	N.N.W. „ N.	
4	N. by W.	E. by N.	N. by W. „ W.	S. by E.	N. by W. „ N.	
5	North.	East	North „ W.	South	North „ E.	
6	N. by E.	E. by S.	N. by E. „ N.	S. by W.	N. by E. „ E.	
7	N.N.E.	E.S.E.	N.N.E. „ N.	S.S.W.	N.N.E. „ E.	
8	N.E. by N.	S.E. by E.	N.E. by N. „ N.	S.W. by S.	N.E. by N. „ E.	
9	N.E.	S.E.	N.E. „ N.	S.W.	N.E. „ E.	
10	N.E. by E.	S.E. by S.	N.E. by E. „ N.	S.W. by W.	N.E. by E. „ E.	
11	E.N.E.	S.S.E.	E.N.E. „ N.	W.S.W.	E.N.E. „ E.	
12	E. by N.	S. by E.	E. by N. „ N.	W. by S.	E. by N. „ E.	
13	East	South	East „ N.	West	East „ S.	
14	E. by S.	S. by W.	E. by S. „ E.	W. by N.	E. by S. „ S.	
15	E.S.E.	S.S.W.	E.S.E. „ E.	W.N.W.	E.S.E. „ S.	
16	S.E. by E.	S.W. by S.	S.E. by E. „ E.	N.W. by W.	S.E. by E. „ S.	
17	S.E.	S.W.	S.E. „ E.	N.W.	S.E. „ S.	
18	S.E. by S.	S.W. by W.	S.E. by S. „ E.	N.W. by N.	S.E. by S. „ S.	
19	S.S.E.	W.S.W.	S.S.E. „ E.	N.N.W.	S.S.E. „ S.	
20	S. by E.	W. by S.	S. by E. „ E.	N. by W.	S. by E. „ S.	
21	South	West	South „ E.	North	South „ W.	
22	S. by W.	W. by N.	S. by W. „ S.	N. by E.	S. by W. „ W.	
23	S.S.W.	W.N.W.	S.S.W. „ S.	N.N.E.	S.S.W. „ W.	
24	S.W. by S.	N.W. by W.	S.W. by S. „ S.	N.E. by N.	S.W. by S. „ W.	
25	S.W.	N.W.	S.W. „ S.	N.E.	S.W. „ W.	

Vessels when overtaken by a typhoon near the Japan coast will, in consequence of its re-curving, and pursuing a north-easterly course, as above-mentioned, be not unfrequently, therefore, on the left-hand side of the path,[*] and will consequently experience winds from E. through North, and N.W., the weather moderating as the wind shifts towards West. It has, however, been observed that during the storm the wind near the coast is principally from the eastward, that is, it blows from that quarter longest.*

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[*] This is not always the case on the south-eastern shores of Japan. Nagasaki was visited by a very severe typhoon on the 20th and 21st August 1874, which did immense damage to both town and shipping, upwards of 100 junks being lost within the harbour. This storm passed over Nagasaki in its progress to the northward, and from the shift of wind experienced (E.S.E. through S.E. and South to S.W.) the centre of its path must have laid to the westward and northward of Nagasaki. During the storm the barometer fell from 29·85 to 28·43 inches, the rate at which it fell being about ·07 in. per hour for the first 12 hours; for two hours (during the height of the hurricane) at the rate of ·18 in. an hour, and attaining its lowest point 14 hours from the commencement of the storm, and again rising to its normal height in about six hours afterwards.—Captain H. B. Woollcombe, R.N., H.M.S. *Thalia*, 1874.

It will be observed that vessels under these circumstances near the south-east coast of Japan, if hove-to on the port tack (the ship being on the left-hand side of the path, and the storm travelling to the north-eastward), will be heading off shore, and as the wind veers the coast becomes a weather shore. It would, however, be prudent if in such a position, to make for one of the numerous harbours on the south coast of Nipon on the first indication of an approaching typhoon,† as the atmosphere soon becomes thick and obscures the land; this circumstance, combined with the strong north-easterly current experienced in this locality (Kuro Siwo), and the consequent more than usually heavy sea, will render the ship's position very precarious.

Typhoons occur in the neighbourhood of the Japan islands from June to the end of October, the last named month and September being in this respect the worst in the year; those occurring in the early part of the season visit chiefly the southern part of Japan, while those later in the season reach the northern portion.

Although the prediction of a typhoon is, to a certain extent, problematical, yet the nature of the atmosphere immediately preceding one of these storms is always such as to raise suspicion. The heat is unusually oppressive, with fitful gusts of wind and rain, the barometer standing at above the normal level but exhibiting unusual fluctuations, and the wind is for the preceding 24 hours very variable in direction, blowing at short intervals from all quarters of the compass; then the barometer commences to fall, at first, slowly, and the atmosphere becomes thick and murky, the wind (in most instances) eventually settling at about South-east, and blowing with moderate, but gradually increasing force. As the barometer falls considerably below the normal reading the weather becomes thicker and is accompanied by rain, the wind veering slowly towards East and increasing in force. With these indications, and the barometer still falling quickly, the storm is certain to prove cyclonic in character.

The swell preceding a typhoon is not always experienced much in advance of the storm, but there is an inexplicable disturbed motion of the sea which is very noticeable long before the storm is developed.

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* From which it might be inferred that it was the right-hand side of a storm travelling westward which had passed over the coast, but this is apparently a very unusual occurrence.

† That is when the vessel is within a reasonable distance of the Japan coast. Vessels considerably to the southward might experience the storm during its progress in a northerly direction, and southward of 23°N, while it was pursuing a W.N.W. course.

Vessels at sea off the southern and eastern coast of Japan should either at once proceed to a safe anchorage, or try without delay to gain sufficient sea room. In the former case no time should be lost, as once within the limits of the storm the atmosphere becomes so thick that in a very short time nothing is seen of the land. Should it, however, be decided to adopt the other alternative, they should lie-to at about 20 miles from the shore.

Typhoons on the east coast of the Japan islands almost invariably set in with wind from the south-east quarter, showing that the centre passes to the north and west of the coast (probably over the land), and the storm is travelling to the North-east. The storm breaks with violence from East to S.E., veering as the storm passes over to South and S.W., after reaching which quarter it quickly abates. On this coast, therefore, the ship will be in most cases on the right hand side of the storm's path, and will lie-to on the starboard tack. This might appear to be attended with some risk on account of the proximity to land, as the vessel would at first be heading direct for it; but as the wind veers she will gradually head up to N.E. and East, or off-shore.

The progressive movement of a typhoon along the southern and eastern shores of Japan appears to be very rapid as far as cape Sima, it having been observed that they have made that distance (101 miles) in 6 hours, *i.e.*, at the rate of nearly 18 miles an hour; after passing this latter point they appear to diminish their velocity. The centre generally passes apparently over the high mountain ranges and travels parallel with the main direction of the coast, passing west and north of Yokohama.

On the west coast of Nipon, typhoons set in usually with the wind from N.N.E., but as the veering of the wind has been observed to be not in accordance with the known laws which govern these storms, it is to be presumed that they are in their precise characteristics much disturbed and influenced by passing over land of varied elevation and features.

JAPAN STREAM (KURO SIWO).*—The north-east trade drift current of the Pacific, which flows to the westward between the parallels of 9° N. and 20° N., on reaching the eastern shores of the Philippine islands is deflected to the northward, forming in latitude 21° N., between the meridan of 125° E. and the east coast of Formosa, the commencement of the great oceanic current know as the Kuro Siwo, or Japan stream, the limits and velocity of which are considerably influenced by the monsoons of the China sea and the prevailing winds in the Yellow and Japan seas.*

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* Black stream or tide, so called from the dark colour of its waters.

During the north-east monsoon in the China sea, a part of the Pacific drift-current continues its course to the westward through the Bashee and Balintang channels, joining the monsoon drift current which sets strong to the south-westward at this season, through the Formosa channel and China sea.†

During the south-west monsoon the drift current which flows to the northward in the China sea and Formosa channel, joins the Kuro Siwo, and extends the western limit of its stream to a line joining the island of Tung-Ying (on the east coast of China) to Tsu sima (in the Korea strait); this limit is very perceptible, the waters of the Japan stream being of a dark blue colour, whilst that of the colder water is of a pale green; the difference in temperature of the two streams is also very marked.

The main body of the Kuro Siwo is joined at this season by the monsoon drift-current of the China sea, which also sets to the north-east through the Bashee and Balintang channels, and being augmented in force, flows rapidly to the northward along the east coast of Formosa, passing between the north end of that island and the Meiaco sima group, as far as the parallel of 26° N., where it turns to the eastward and continues in a north-easterly direction to the westward of the Liu-Kiu islands until it reaches the southern point of Japan; here an off-shoot of the main stream passes to the northward through the Korea strait into the Japan sea (*see* page 6). The main body of the stream, however, continues its north-easterly course gradually trending still more to the eastward, and flows in an east-north-east direction through Van Diemen strait, the numerous channels between the islands north of the Linschoten group, and along the southern shores of the islands of Kiusiu and Sikok, forming along its margin (especially near the shore where it meets with an opposing tide) races and tide rips often resembling heavy breakers on reefs or shoals. The Kuro Siwo attains its greatest velocity when abreast of the island of Sikok, where it has been known to set 100 miles in 24 hours; its usual velocity in this locality, however, is from 2 to 3 knots an hour.

Continuing its course along the south coast of the island of Nipon, past the gulf of Yedo, the Kuro Siwo flows through the chain of islands lying south of that gulf, in the numerous channels between which its direction is found to be variable and under tidal influence* and it is particularly in this locality that heavy tide rips and whirlpools are met with. Still continuing in an east-north-east direction as far as latitude 36½° N., the northern edge of the Japan stream then leaves the coast of Nipon (which takes a sudden trend to the northward from about Inu-bo-ye saki) and flows in a north-easterly direction, while a cold arctic current, setting to the southward along the shores of Kamchatka and the Kuril islands, intervenes between the Kuro Siwo and the north-eastern shores of Nipon and Yezo (*see* page 40). Continuing to the north-eastward, the Kuro Siwo begins to expand, and diminishes greatly in velocity after passing the meridian of 145° E.

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* *See* Admiralty chart:—Stream and drift currents of Pacific, Atlantic, and Indian Oceans, No. 2,640.

† *See* also page 39 for further information relating to the velocity and temperature during this monsoon.

At about the meridian of 150° E. the Kuro Siwo divides, one stream flowing to the northward and, taking the name of the Kamchatka current, is felt as far as the Aleutian islands and Behring strait (*see* page 40), whilst the greater portion of the stream continues in an easterly direction, between the parallels of 32° N., and 41° N. as far as the meridian of 160° E., where it is deflected to the south-eastward as far as the meridian of 180°, there losing its identity in the drift-currents of the North Pacific ocean which flow to the north and north-eastward.

The maximum temperature of the waters of the Kuro Siwo during the south-west monsoon is 86°, and its north-western edge where it is contiguous to the cold current setting southward along the north-east coast of Nipon, is strongly marked by a sudden thermal change in the water of from 12° to 20°, a feature almost as marked as the thermal change experienced when passing from the Gulf stream into the "cold wall" off the coast of the United States. The southern and eastern limits, at this season extending to the Bonin islands, are much less distinctly marked.

It has been thought that the Kuro Siwo and the Gulf stream present features that are analogous in the constant high temperature of their waters, but from numerous observations of temperature in the former it appears they do not.

In the summer months, viz., from May to September inclusive, the mean temperature of the stream is 82°, or 7° higher than the mean temperature of the ocean, due to its latitude; it is during these months that the flow of tropical waters from the equatorial and drift-currents of the Pacific, together with the monsoon drifts of the China sea, join to swell the stream, increase the velocity, and raise the temperature of the Kuro Siwo.

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* In a boat anchored in 10 fathoms close off the south-west point of Fatsizio, the flood, according to time of high water at Susaki (Tatiyama), set to the S.S.E. 3 to 4 knots, and changed at the ebb to the N.N.W, Between Fatsizio and Mikura, the ebb stream (by the shore) was found setting to the N.N.W. 2 to 3 knots; also to the N. by W. 3 to 4 knots near the Broughton rocks; and, near the Redfield rocks, the flood (by the shore) set to the S.W. 2 to 3 knots.—Lieutenant C. J Bullock, R.N., Commanding H.M. surveying vessel *Dove*, 1861.

In the months of April and October hot and cold belts* are found alternating in the stream, the temperatures of which belts differ from 7° to 10°; whilst during the winter months, viz., from November to March, the temperature of the stream, attaining in the latitude of Formosa a mean of 74° (which is rather higher than the temperature of the ocean, due to its latitude), falls on reaching the shores of Japan to 63°, or below the temperature of the ocean at the same season : this may be accounted for by the fact that during these months the great body of water which lies to the westward of the Liu-Kiu islands between the parallels of 26° N. and 28½° N., and which during the summer season flowed to the north-east at the rate of from 20 to 30 miles a day, bringing water of a high temperature from the China sea to join the Kuro Siwo, is now quiescent, no perceptible current being experienced within its limits; whilst further to the north of this still water, a cold current, forced down by the prevailing northerly winds in the Japan and Yellow seas, and setting strong to the eastward between the parallels 29° N. and 31° N., flows through Van Dieman strait and joins the Kuro Siwo, the temperature of which is thus considerably lowered; at the same time the stream is contracted to an average width of 250 miles in the meridian of 142° E., and its velocity is diminished to a mean rate of 2 knots an hour in consequence of the cessation of the supply of tropical waters.

As the northerly and north-westerly winds take off towards the end of May and beginning of June in the Japan and Yellow seas, the drift current which has been brought down by these prevailing winds ceases, causing at that time a considerable decrease in the velocity of the Kuro Siwo south of Nipon island, the stream being then only fed from the equatorial current of the Pacific ocean. Later on, however, in June, the warm waters of the China sea forced northward by the prevailing south-west winds joins the

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* When in the stream (in April) the temperature of the surface water varied from 63° to 68° changing suddenly from the one to the other temperature, giving alternate streams of hot and cold water without our being able to detect any alteration in its rapidity. That this was the case is readily proved by our observations from 7 a.m. to 10 p.m. on the 10th of April, the observations taken at different times all agreeing in showing a steady set of 3 miles per hour although the temperature of the sea changed suddenly at 1 p.m. from 68° to 64° and at 7 p.m. from 63° to 68°. These peculiarities are probably not experienced to the eastward of the meridian of 140° E.—Staff-Commander T. H. Tizard, R.N., H.M.S. *Challenger*, 1873-76.

Kuro Siwo, which in July and August attains its greatest velocity and is wholly a warm current.*

There is a floating seaweed found in the stream resembling the *fucus natans* of the Gulf stream.

THE KAMCHATKA CURRENT is a branch of the Kuro Siwo, from which it separates in the parallel of 40° N. on the meridian of 150° E., and flows at an average rate of 18 miles a day (with a breadth of about 200 miles) to the north-eastward as far as 51° N., where it deflects to the eastward towards the Aleutian islands; between the parallels of 51° N. and 60° N. there is a difficulty in tracing it,† but beyond 60° N. it is again found setting to the north-east, and passing west of St. Mathew island and east of St. Lawrence island, it flows along the American coast through Behring strait into the Arctic ocean; in the strait the mean temperature of its waters (52°) is 15° higher than that of the waters along the Asiatic shore. The channel between St. Lawrence island and the coast of Asia is blocked in with ice until July, while from the higher temperature of this stream the coast of America is entirely free of it in the month of April.

THE OYA SIWO.—A counter current of cold water called the Oya Siwo sets to the southward, along the south-east coast of Kamchatka and the Kuril islands, and, flowing along the east coast of Yezo island and north-east coast of Nipon, is felt as far south as Inu-bo-ye saki. It has an average breadth of 200 miles, but varies in velocity and extent in the different seasons, being much stronger in the winter than in the summer. This counter current is shown in Japanese itineraries, where the junk course northward is drawn well off shore, so as to avoid it by passing outside and getting into the Kamchatka current.

Except between the Kuril islands, through the straits, and past cape Noyshaf, the force of the cold stream is about 18 miles a day; through these narrows however it sweeps occasionally with great speed, particularly during or after a strong north-easterly wind. Whirls, eddies, and tide rips are to be met with off cape Noyshaf.

During the spring (April), great quantities of floating ice are frequently brought down from the Kuril islands and the northward, and are left grounded along the Yezo coast from cape Yerimo eastward to cape Noyshaf.*

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* In the month of May a moderate set to the eastward was experienced close to the south coast of Nipon island. In June no current was found at a distance of 30 to 40 miles from that coast, but to the south-eastward of Nipon the current set to the north-eastward at the rate of 2 miles an hour, with a mean temperature of 72°·5.—Staff-Commander T. H. Tizard, R.N.

† Observations in this locality are few and imperfect.

The temperature of the Oya Siwo varies, according to the season, from 10° to 15° lower than that of the Kuro Siwo. The average temperature of this current in May was 37° (10° below that of the surrounding atmosphere). In July the temperature was observed to be 66° at between 10 and 30 miles from the shore; farther off shore where the temperature rose to 70°, or where it bordered on the Kamchatka current flowing to the northward, the current is not perceptible. After passing westward round Inu-bo-ye saki, the temperature of the sea water has been observed to rise from 66° to 79°, the stream of the Kuro Siwo being at once experienced setting N.E. by E. at the rate of 2 knots an hour: The Oya Siwo is not felt close to the shore of Nipon, along which the tidal streams are well defined.

Along the margin of the Kuro Siwo and Oya Siwo where they flow contiguous to each other (in opposite directions) violent squalls are frequently met with, lightning generally indicating the quarter from which the storm may be expected.

PASSAGES.

DURING the NORTH-EAST MONSOON. — Hong Kong to Yokohama.—A vessel bound from Hong Kong to Yokohama at this season should work up the coast of China as far as Breaker point, taking care to be always under the land at nightfall, the wind during the night always hauling to the northward (off the land), when she may make a long tack off, standing in again in the morning when the wind shifts to the north-east, and frequently more easterly still. From Breaker point the vessel may then stand across, with the wind free, for the south end of Formosa island, experiencing a southerly set whilst in the Formosa channel; but on nearing the island she will lose it, and, on passing South cape, Formosa island, will fall in with the Kuro Siwo setting strong to the north-east. Vessels following this route (which is usually taken) from March to June inclusive, but more especially in March and April during brisk north-east winds and a strong westerly current, frequently take a week working along shore to reach Breaker point before standing off.

Whereas, it has been found that, had vessels after clearing the Lema channel stood off on a wind, clean full, to the south-east, they would soon have got out of the westerly current, and on nearing Luzon would experience the wind more from the eastward and sometimes from south-east, enabling them to tack to the N.N.E. with a strong current in their favour, and thus would probably get to the eastward of Formosa in less time than it would have taken to reach Breaker point by keeping along the coast of China.

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* Commander H. C. St. John, R.N.

Having passed South cape, the vessel may work up the coast of that island, passing eastward of it between it and the Meiaco sima group, and to the westward of the Liu-Kiu islands, having the current with her as far as the parallel of 26° N., beyond which parallel she will experience no current until 30° N., where a strong current will be found setting to the eastward, the wind also being more from the North and West.* She may then pass through any of the channels between the islands lying off the south point of Japan, (remembering that in Van Diemen strait bad weather with thick atmosphere is most frequently met with) after which, keeping at about from 50 to 80 miles from the land, in the strength of the Kuro Siwo, she may make the lights at Ō sima (entrance to the Kii channel), and passing them at a distance of from 5 to 10 miles, may steer to pass just outside Mikomoto (Rock island). (For directions for the gulf of Yedo, *see* page 317).

A full-powered steam vessel proceeding from Hong Kong to Yokohama in the N.E. monsoon should keep as close as possible to the China coast, taking shelter from the wind and sea behind the islands and reefs which line the coast. This route is especially favourable between Namoa and the north part of the Formosa channel, where the wind is the strongest. On leaving the Formosa channel it will be well to still keep more or less to the China coast as far as Foochow, and then to shape a course for the channel between Tokara and Yokosima (Linschöten islands) so as to get within the influence of the Kuro Siwo, and the north-west breezes as soon as possible. Then steer to sight Oo sima light, keeping well off shore in the strength of the current. In any case it will be well to sight Omai saki light before making for Rock island light, which by day is sometimes, in consequence of its being low, difficult to recognise, and to the west of which, near the coast, the currents are irregular.

From Yokohama to Hong Kong.—On leaving the gulf of Yedo, a sailing vessel should stand to the south-westward as far as 28° S. and 135° E., whence a course may be shaped to pass northward of Kakirouma, one of the Liu-Kiu group, thus avoiding the influence of the Kuro Siwo. After passing Iwo sima a straight course may be steered for Tung Ying, on making which island stand down the China coast for Hong Kong.

During winter a steam vessel should keep as close to the coast of Japan as is prudent, out of the strength of the current, and pass through Van

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* For sailing vessels, or those depending only on auxiliary steam power, this route is by far the best, and under ordinary circumstances the voyage can be made in 15 days.

Diemen strait, thence steering to pass well northward of the north end of Formosa, to make the China coast, so as to get out of the influence of the Kuro Siwo as soon as possible, and come within the strength of the N.E. monsoon. Thence steer down the coast for Hong Kong.

Nagasaki to Hong Kong and back.—A sailing vessel or auxiliary steamer proceeding from Nagasaki to Hong Kong during the winter months should steer to make the China coast a little below Chusan, so as to fall in with the strength of the north-east monsoon as soon as possible. The direct route does not admit of a vessel falling in with it before the fourth day on a voyage of average speed. Proceeding from Hong Kong to Nagasaki during the same season the China coast should be kept (within the islands) until north of Foochow, whence a direct course may be shaped.

From Shanghae to Nagasaki.—At this season, if the wind is to the eastward of North, it would be well on leaving the Yang-tse to stand to the north-westward on the starboard tack, and when the wind hauls round to the north-westward, which it will do as the ship advances northward, tack, and steer a straight course for Nagasaki, making allowance for the south-easterly and easterly set from the Yellow sea and Korea strait, otherwise the ship may be swept to the eastward through Van Diemen strait. During the periodic easterly winds (variable between E.N.E. and S.E.) which prevail on the China coast in the vicinity of the Yang-tse, from March to June inclusive, with a sailing vessel, every opportunity must be taken to make easting, even with a fair wind, which it may be almost surely inferred will be but of short duration. In May and June, however, the set of the current will be changed, and will be found setting to the north-eastward; under these circumstances there is a probability that a vessel kept on the starboard tack would be set over to the Korean archipelago. With these considerations the navigator must act on his own judgment, there being only difficulty in making the passage, when baffling winds, and thick, rainy, and squally weather are met with in the vicinity of the Mé sima group and the Pallas rocks, or the Goto islands, or they are passed on dark nights. If not, therefore, sure of the vessel's position, it would be well to make them in the daytime, unless the nights are moderately fine. The light on Ose saki (cape Goto) the southern point of the Goto islands is of great assistance in making this passage.

Hakodate through Korea strait.—If bound on to Hakodate at the same season, or even as late as the end of June, it will be found difficult with a sailing vessel to make easting at all, along the west coast of Nipon. It will be advantageous in April, May, and June, to pass well east of Tsu sima in the strength of the Japan stream which sets N.E. by N.

through the Korea strait, attaining at times, although not constant, a velocity of 2 knots an hour. Should a S.W. wind occur at this season, it may be expected to last only 24 hours, unless it follow an easterly gale with depressed barometer. During the winter, gales from North and N.W. are very frequent in the Korea strait, lasting three or four days, and are sometimes violent. A rapidly falling barometer indicates their approach, the wind increasing in force after the mercury commences to rise, and not attaining its height until 24 hours after. In such weather, if making for Nagasaki on the port tack, beware of being blown to leeward into Van Diemen strait, for if set through by the Japan stream, it will take a long time to regain the lost ground against the current—one vessel having been nearly three weeks endeavouring to beat round Sata no misaki (cape Chichakoff); and if on the starboard tack, there is probability of being set up the Korea strait to the northward of Ose saki. As both cases have happened to vessels, it is recommended that they should endeavour to make the land in daylight, and find anchorage, or secure a knowledge of their position.

In winter, when north-west and west winds prevail, a direct course should be steered from the Korea strait when bound to Hakodate; but if bound from Hakodate southward, it is necessary to endeavour to make westing when possible, and keep a long offing, for the coast of Nipon is a lee shore. After passing Korea strait as well to windward as possible, the winds will be found more liable to change when arrived at lat. 32° N., long. 125° E., but sometimes they continue so steadily between N.W. and W.S.W., as to set a vessel to leeward of the Yang-tse.

Yokohama to Hakodate.—In winter.—With the exception of the severe cold the winter is the most favourable season for making this voyage, as the wind at this period of the year is nearly always off the land, and consequently smooth water is experienced in-shore along the coast of Nipon. At this season, however, strong N.E. gales are occasionally met with, especially at the periods of full and change of the moon, causing a very heavy head sea, against which only powerful steamers can make any headway, and the most prudent course to adopt when a gale from this quarter is encountered, is to make for the nearest sheltered anchorage, and wait until the weather moderates.

After leaving No sima light, vessels should steer to pass cape Kamatsu at a distance of from 3 to 4 miles, and thence to round Inu-bo-ye saki at from 5 to 6 miles. With westerly winds the current will be favourable, but at this season with winds from the eastward, frequently no current is perceptible along this part of the coast. From Inu-bo-ye saki steer to pass cape Toyoma (Kunya saki) at from 3 to 4 miles distant, the current setting to the northward and eastward, at the rate of one mile an hour.

From Kunaya saki a steamer can leave the land and shape a direct course for Kingkasan light.

From Kingkasan steer for cape Kiori, hugging the land as far as Miyako; between these points the vessel will be within the influence of the Oya Siwo, which sets to the south and east along this coast, sometimes attaining a velocity of 2 miles an hour; and thick weather with heavy snow-storms are of frequent occurrence. Vessels should keep as near the coast as prudence will admit of, in order to escape the full force of the Oya Siwo, and to enable the ship's position to be frequently ascertained.

From Kunya saki keep close to the land as far as cape de Vries, keeping a good look out for the shoals off the latter cape, after passing which steer direct for Siriya saki. The irregularity of the currents, and the fact of the land being so frequently hidden by snow-storms and thick weather, renders it necessary to use every precaution when navigating this part of the coast.

After making Siriya saki, sailing vessels meeting a head wind (westerly) in Tsugar strait, should work up along the northern shore of Nipon as far as Low islet, when she should stand across the strait for cape Blunt (on the Yezo shore) until this cape bears East, when she should work up along the Yezo coast—where she will find smooth water, and be out of the strength of the easterly current—to Hakodate.

The navigation of this coast is greatly facilitated by the lights on Kingkasan and Siriya saki; but considering the frequent thick weather and snow-storms experienced along this coast in winter, and the uncertainty of the tidal streams, no opportunity of verifying the ship's position should be neglected.

In summer.—During the summer months vessels should, as in winter, keep near the land, particularly in the early months, as during March and April strong easterly winds are often to be met with at sea, when at the same time light northerly breezes with rain prevail along the coast. Off Kingkasan, where the vessel will pass out of the influence of the Kuro Siwo (at this season much increased in velocity), into the Oya Siwo, a dense bank of fog is met with, the southern face of which is often as steep and well defined as a wall; vessels generally run into this fog bank quite suddenly, passing from bright sunlight to gloom. From here northward during the summer months the density and permanency of these fogs forms a serious impediment to navigation, rendering the very greatest caution, and frequent attention to the soundings, absolutely indispensable.

Should thick weather prevent Siriya saki light being seen, the temperature of the sea water will, if carefully watched, be a guide as to whether the vessel has passed the cape, as the temperature of the sea in Tsugar strait is invariably higher than that of the sea to the southward. Heavy tide rips too are invariably met with in the centre of the eastern entrance to the strait,* about 10 miles north of Siriya saki; and also when the vessel comes within the influence of the easterly current setting through the strait, much floating débris, such as plants, trees, and driftwood, is met with which will assist, in thick weather, in determining when the vessel has cleared Siriya saki.

Should calms or easterly winds have been experienced outside, and the wind has hauled to the northward as the strait is approached, clear weather will be met with off cape Blunt. When a strong easterly wind is blowing the whole strait is enveloped in fog.

Shanghae to Yokohama.—On leaving the river Yang-tse the wind will be rarely found as far to the eastward as N.E.; it is best, therefore, to keep the ship on the starboard tack, remembering that she will be set to the eastward toward Van Diemen strait; after passing which pursue the same route as directed in the passage from Hong Kong.

DURING the SOUTH-WEST MONSOON.—Hong Kong to Yokohama.—A vessel bound from Hong Kong to Yokohama should run up the China coast as far as Tung Ying, then shape a course for Akusi sima, one of the Linschoten group; on passing the meridian of 125° E. the set will be strong to the north-eastward. Pass through any of the channels between the islands south of Japan in preference to Van Diemen strait, as the dense fogs which hang over the coast at this season render the navigation of this strait difficult, whilst farther seaward when in the warm stream of the Kuro Siwo the atmosphere is bright and clear. The route recommended is after leaving the China coast to steer so as to pass a few miles clear of the north end of Formosa, and thence for the channel between Tokara sima and Yoko sima (Linschoten islands). After passing the channel steer to make the lights at Ō sima (entrance to Kii channel), remembering that the current sets along the coast of Japan to the north-eastward at this season at from 2 to 4½ knots an hour. After passing Ō sima at a distance of from 5 to 10 miles steer to make Omai saki, whence proceed on for Mikomoto (Rock island) light. If bound from Hong Kong to Nagasaki, after leaving Tung Ying steer for the Mé sima group, and passing between it and the Pallas rocks, a course E.N.E. 80 miles will place the ship off the lighthouse on Signal head (the North point of Iwo sima) at the entrance to Nagasaki harbour, on nearing which it should not be brought to bear northward of N.N.E.

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* The marked features, and permanency as regards locality, of these heavy tide-rips or overfalls—caused by the meeting of the easterly current (warm) through Tsugar strait with the Oya Siwo (cold) setting to the southward—is most useful; for when Siriya saki is obscured by fog these overfalls indicate the vessels position almost as truly as bearings of the land.

From Yokohama to Hong Kong.—A sailing vessel leaving the gulf of Yedo should shape a course to the south-eastward to cross the parallel of 30° N. in about 145° E., and passing East of St. Margaret's island, cross the meridian of 140° E. in lat. 21° N.; thence steer (with a favourable current) for the north-east point of Luzon, on passing which enter the China sea, when a direct course may be shaped for Hong Kong, taking care to allow for the drift-current setting to the north-east at this season. It may here be remarked that this route lies directly across the paths of typhoons, which are prevalent in the tropics at this period.

Steam vessels, usually on leaving Yedo gulf, and passing Mikomoto (Rock island), keep well in shore to Ō sima, passing which they keep up the Kii channel through Isumi strait and the Inland sea. On passing Simonoseki strait, if not bound to Nagasaki, they keep westward of the Goto islands, and making the Saddle islands off the Yangtse keep close to the shore, and from thence pursue the same course to the southward as vessels bound from Shanghae to Hong Kong.* Some steam vessels, however, adopt the same route as in winter as far as the entrance to the Formosa channel whence a straight course is shaped for Hong Kong.

From Shanghae to Nagasaki.—On leaving the Yang-tse steer to pass between the Pallas rocks and Mé sima group (Asses Ears), which last is visible in clear weather at a distance of 30 miles. The current will be found setting to the north-eastward through Korea straits (*see* page 6), care must be taken, therefore, to avoid being set to the northward of Ose saki, the south point of the Goto islands (on which there is now a lighthouse), as the current during the south-west monsoon is often strong in this locality. Passing the Amherst rocks a course E. ¾ N. 390 miles will lead midway between the Pallas rocks and Ose saki (cape Goto).

Navigation in the Sea of Japan.—Proceeding from Hakodate to any port on the coast of Russian Tartary (Manchuria) especially during the summer months, when the winds from seaward are almost invariably accompanied by fog, the marked change in the thermal condition of the water lying contiguous to the shores of the continent compared with the higher temperature of the sea off-shore (consequent on a branch of the Kuro Siwo entering the Japan sea through the Korea strait) is of great assistance in determining when the vessel is nearing the land. This change appears to be felt all along the coast northward of Murray sound.

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* *See* China Sea Directory, Vol. III.

From Sydney to Yokohama.—Vessels bound from Sydney to Japan should pursue, as far as lat. 8° N. and long. 160° E., the same course as those bound for Hong Kong; from that position a course should be shaped to pass to the northward of the Mariana islands and to the south-westward of the Volcano islands, after passing which steer to make Ō sima lights, remembering that the ship must pass through the strength of the Kuro Siwo, and will, when in its stream, be set to the north-eastward from 2 to 3 knots an hour.

CHAPTER II.

WEST, SOUTH-WEST, AND SOUTH COASTS OF KOREA; AND KOREA STRAIT.

VARIATION 4° 20′ West in 1884.

The KOREA[*] is separated from China on the north-west by the Yalu kiang, and from Russian Tartary on the north-east by the Tumen ula. It has an area of about 80,000 square miles and a coast line of 1,700 miles. The west and south coasts of this peninsula are fringed with numerous islands extending from 20 to 50 miles from the mainland, and affording sheltered anchorage amongst them. On the mainland there are also several good harbours and navigable rivers. The east coast of the Korea is high, and has comparatively few harbours or islands.

Although Korea has for centuries successfully carried out a policy of isolation, a treaty of friendship was made with Japan in February 1876, and ports were to be opened for trade between the two countries. The following are the ports now open (1883):—Ninsen (Inchön or Jin Chuen), on the west coast; Fusan (Pusan), and Gensan (Wönsan) on the east coast.[†]

The COAST[‡] eastward of the Yalu kiang appears to trend to the south-east as far as Ping Yang inlet, and is skirted by numerous islands) the whole of which are as yet unexplored. Banks with shoal water on them extend a long distance to seaward of these islands, and vessels navigating in this locality should use great caution, as banks of rock and sand rise precipitously from the water.

PYLADES SHOAL, in lat. 38° 55′ N., long. 124° 39′ E., is a shoal bank, which appears to be joined to the group of lofty islands lying about 12 miles south-east of this position.

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[*] *See* Admiralty charts:—Gulfs of Pe-chili and Liau-tung, No. 1,256; Japan and part of Korea, No. 2,347, scale $d = 2{\cdot}2$ inches; Korean Archipelago, No. 104, scale $m = 0{\cdot}16$ of an inch; and the Western coast of Kiusiu and Nipon, including Korea strait, No. 358, scale $m = 0{\cdot}13$ of an inch.

[†] Fusan and Gensan were visited by the squadron under Vice-Admiral G. O. Willes, C.B., in 1882.

[‡] In this edition much valuable information relating to the Korean coast has been derived from the surveys made by H.M. ships *Sylvia* in 1876; and *Flying Fish* and *Magpie*, 1882–3.

PING YANG INLET,[*] situated at the mouth of the Ping Yang river, is difficult of approach owing to the numerous shoals which encumber its entrance. A good anchorage may be obtained in 9 fathoms, mud, with Station island bearing N. by W., and Cowies point W. by N. Station island is in lat. 38° 42½′ N., long. 125° 10′ E.

Tides.—It is high water, full and change, in Ping Yang inlet at 7 h. 45 m.; springs rise 21 feet, neaps 14 feet.

The COAST from Ping Yang inlet trends to the south-west to Humbug point, off which lies the island of Douchen, having between it and the mainland a channel, 1¼ miles wide, carrying a depth of 10 fathoms. From Humbug point the coast trends in a south-west direction for 17 miles as far as Phelans point; midway between these points lies Choda island, forming a channel 4 miles wide (Febigers channel), in which there is deep water.

CHODA ISLAND is well wooded and cultivated, having on its southern shore a small bight, in which are two villages and a harbour for junks. About a mile southward of the west point of the island, near which is a small islet, is the beginning of an extensive shoal bank projecting to the south-westward for 5 or 6 miles; its exact extent, however, has not been determined.

Anchorage may be obtained in 8 and 10 fathoms in Febigers channel, between the north end of the bank and the small islet; sheltered by Choda island to the north-east, and by the bank to the west. The shore around this bight is studded with villages and well cultivated.

Tides.—On the 3rd and 4th September 1856 (three and four days after the change of moon), it was high water in the bay on the south side of Choda at 8h. 40m., and the tide rose 10 feet; the approximate establishment, full and change, may be assumed at 6h. 20m., and the rise 11 to 12 feet.

The COAST from Phelans point to the entrance of Ta-Tong river trends S.S.W. for 17 miles, forming the promontory of Chwang-shan; this coast was visited by the ship *Amherst*[†] in 1832, and received the name of Daniel island; it is, however, evidently part of the mainland of Korea but has not yet been surveyed. The land is clothed with luxuriant vegetation and high trees; the lower part near the sea was cleared and cultivated, and numerous cattle and several villages were seen.

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[*] *See* Admiralty plan :—Ping Yang inlet, No. 1,257, scale $m = 0 \cdot 6$ inch.

[†] From the voyage of the ship *Amherst* to the northern ports of China, Gutzlaff's third voyage in 1832.

TA-TONG RIVER.*—From Chwang-shan promontory the coast trends to the eastward, forming a deep bight, into which flows the Ta-Tong river. On entering this bight, pass the north point of Peh Leng Tao (the northern island of Sir James Hall group) within 1½ miles, and steer a N.E. by E. course until in mid-channel between the mainland and the island of Yau-nae-tau, after passing which the chart will be found sufficient guide. The Ta-Tong river is reported by the natives to be only navigable for junks and boats.

Tides.—It is high water, full and change, at Neu To island, on the north shore, at 6h. 30m.; rise about 13 feet. The ebb generally sets to the eastward, and the flood to the westward, they are, however, irregular both in force and direction.

SIR JAMES HALL GROUP, consists of three islands, lying off the entrance to Ta-Tong river, at about 10 miles south of Chwang Shan promontory.

The group is visited yearly by a large number of junks from Chi-fu and the northern part of China, for fishing. The native population is small and poor.

Peh Leng Tao (Pèng Yŏng Do), about 600 feet high, the northern and largest of Sir James Hall group, is about 6 miles long east and west and 4 miles broad, fronted on the north-west point by bold perpendicular cliffs about 300 feet high, at the extreme of which is an off-lying needle-shaped rock, 183 feet high, named Finger rock.

Along the north-west side of the island, a few detached rocks extend a cable off shore, but the west side is cliffy, and free from off-lying rocks.

The south and east coasts are sandy, with numerous bays and rocky points.

The hills at the back are smooth-topped and covered with grass, and can easily be distinguished when standing in from the south-eastward.

Middle rock, a conspicuous double rock, 70 feet high, situated midway between Peh Leng Tao and Ta Cheng Tao, has a bank of irregular soundings extending from it, in a W. by N. direction 2½ miles. There are several rocks between Middle rock and Peh Leng Tao, and at half a mile south of it there is a rock awash at low water.

Ta Cheng Tao (Té Chŏng Do), situated 4 miles south of Peh Leng Tao, has a conspicuous peak about 1,119 feet high, which appears conical in form when seen from the westward.

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* *See* Admiralty chart: —Approach to Ta-Tong river, No. 1,257, scale $m = 0{\cdot}6$ inch.

This island is about 3 miles long N.E. and S.W. and 2 miles broad; the coast line is generally cliffy, but on the northern shore there are patches of white sand of considerable size.

A shoal which partially dries extends about 3 miles in a north-westerly direction from Ta Cheng Tao.

Anchorage, in 6 to 8 fathoms, mud and sand, may be obtained on the east side of the island, in a bay with a shingle beach, off a small village (Pechinpho), with the east point of the bay bearing N. by E. ¼ E., and centre of village S.W. by W. ¾ W. This anchorage is protected from S.S.W. round by west to N. by E., and is also sheltered from heavy seas from the southward by Sho Cheng Tao; it is therefore preferable to the anchorage in the south bay of that island.

Barren island, 146 feet high, and rocky, lies about one mile west of the south-west point of Ta Cheng Tao. A rock 24 feet high, lies a quarter of a mile north of Barren island.

Sho Cheng Tao (So I Chöng Do), about 600 feet high, situated about 2 miles south-east of Ta Cheng Tao, is 2½ miles long E.N.E. and W.S.W. and half a mile broad, having off its south-west point a chain of rocks 9 to 10 feet high, extending about half a mile in a S. by W. direction for about half a mile.

The south-east point is remarkable from its being fronted with white cliffs. A sharp conical rock, lies about a quarter of a mile to the east-south-east of the point; and a rock 6 feet high, at one third of a mile from its north-east extremity.

A shoal with 3 to 4 fathoms water lies about 2 miles East of Sho Cheng Tao.

Anchorage may be obtained in 6 fathoms, sand, in a bay in which are two villages, on the south side of the island. This bay affords shelter from W.S.W. round by north, to E. by N., but is entirely open to the southward.

At one mile N. by E. from the north-west point of Sho Cheng Tao, there is a 5 fathom patch, not thoroughly examined, and should, therefore, be avoided.

Tides.—The general direction of the tidal streams in this neighbourhood is parallel to the coast, the flood running to the northward, and the ebb to the southward; in the channel between Sho Cheng Tao and Ta Cheng Tao the flood-stream sets to the north-east, and the ebb-stream to the south-west.

Between Ta Cheng Tao and Peh Leng Tao, the flood-stream sets north-westward and the ebb-stream south-eastward about 2 knots an hour. It is high water, full and change, at 6h. 30m. (approximately).

The COAST from Ta Tong river to Tsia Tung islands, at the entrance to Séoul river, a distance of about 45 miles, thence to Moulaku-to at the entrance of Salée river, a distance of about 25 miles to the south-east, has not yet (1883) been surveyed.

Tsia-tung islands consist of two islands with several detached islets and rocks between them. The northern island is the larger and presents a level appearance; off the western extreme is a remarkable rock (Finger rock). The southern island (Sho-tung-to) has a high conical summit, and is in about lat. 37° 34′ N., long. 125° 40′ E. There is apparently deep water between these islands. A rock awash is reported to lie 2 miles south of Sho-tung-to.

Bank.—H.M.S. *Vigilant*, 1882, struck soundings on a bank lying about 33 miles westward of Séoul river entrance, in lat. 37° 20′ N., long. 125° 15′ E. (approximate). This bank is stated to be apparently 2 to 3 miles in extent, with depths of from 7 to 9 fathoms on it.

As it was supposed to be nearly high water when the vessel passed over the bank, and the rise of tide being probably about 12 feet—5 fathoms at low water may be considered the least depth in the position reported.*

SÉOUL RIVER.†—To the northward and eastward of Tsia-tung islands there are numerous islets and rocks bordering on the northern side of the channel into Séoul river, the entrance to which lies between Lundy island (at 14 miles east of the S.E Tsia-tung island) and Kuroda island, a small islet about 6 miles S.S.E. from it. From the entrance between these islands the channel takes a N.N.E. direction for about 9 miles with depths varying from 6 to 9 fathoms as far as Cone island, on the northern bank; thence N.E. by E. for about 7 miles with an average width of 1½ miles, and deep water. Here the channel skirts the shore of the mainland and narrows to only one or 2 cables between Chin-shan point, on the northern shore (mainland ?), and a dangerous reef of low rocks which cover at high water (Iyo-gwan), and a sand bank extending from Sho-tao, an island on the south side of the channel, nearly across to Chin-shan point. Séoul, the capital of the Korea, is about 50 miles from this point.

Approach to SÉOUL RIVER.—Shoals.—A depth of 2 fathoms was obtained, S. by W. ½ W., distant 10¼ miles from the south point of Sho-tung-to (Tsia-tung islands).‡

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* Lieutenant C. Lindsay, R.N.

† *See* Admiralty chart :—Approaches to Séoul, the rivers Salée and Séoul, No. 1,258 ; scale, $m=0\cdot4$ of an inch.

‡ Lieutenant R. F. Hoskyn, H.M. surveying vessel *Flying Fish*, 1882.

Whitthall group.—A bank of 1½ to 2 fathoms, extends W. by S. about 3 miles from the south point of Whitthall group. Between this bank and the bank E. by N. of Moulaku-to, there is a depth of 2 to 2¾ fathoms.

Between the south point of Whitthall group and the islet off the north west point of Tcha-oul-to (Marolles island), there is a depth of 16 to 20 fathoms. Banks, some of which dry one foot at low water, extend from he Whitthall group to Richy island.

Emperor rock, which dries at low water, lies W. by N. ¼ N. distant 1¾ miles from the small west islet of Whitthall group.

Banks, dry in places from one to 2 feet, extend 6¼ miles N.E. by E. ¾ E. from the islet off the north-west point of Tcha-oul-to. The north-east extreme of these banks with a depth of 3 fathoms lies 2½ miles S.W. by S. of the south point of Richy island. Between this bank and the shoal water lying between Whitthall group and Richy island, is a straight channel, 1¾ miles wide, with depths from 6 to 10 fathoms.

PRINCE IMPÉRIAL ARCHIPELAGO.*—Southward of the entrance to Séoul river are the numerous isles of the Marie Fortunée and Prince Impérial archipelagos, and to the south-east the shores of Impératrice and Prince Jérôme gulfs. In this direction the channels between the numerous islands, islets, and rocks, forming the main approach to Salée river are now (1883) being explored. The tidal streams are very rapid at spring tides, and navigation in their vicinity should therefore be conducted with great caution.

Moulaku-to, the northern island of the Prince Impérial archipelago, is about 1½ miles long, east and west, and half a mile broad.

A shoal, the north end of which lies 4 miles W. ½ S. from the north-west point of Moulaku-to island, and on which is a depth of only one fathom at low water, extends some distance to the southward; and a depth of 1¾ fathoms was obtained, N.W. ¼ W., distant 6¾ miles from the summit of Moulaku-to island.

A bank of 1½ fathoms lies E. by N., distant 4 miles from the summit of Moulaku-to island, joining the shoals which extend from Taku-cheku-to island to the Whitthall group. This bank apparently extends for a considerable distance in the direction of Moulaku-to.

Jurien de la Gravière, an island about 2 miles long, north and south, and one mile broad, lies nearly 4 miles S.W. by S. from Moulaku-to.

Sa-o-san, an islet 85 feet high, lies 2½ miles W. by N. ¼ N. from the south-west point of Jurien de la Gravière.

FERRIÈRES ISLES, comprised of four islets, is the south-western of the many groups which form part of the Prince Impérial archipelago.

North-west rock has the appearance of two, but its parts are joined by a rocky ledge which is uncovered at low water. The western part is rocky and irregular, and not quite so high as the other, which is 98 feet high, and is regular and steep-to.

North-east rock, the middle one, 179 feet high, is very regular and of greater extent.

South rock rises gradually in cone shape to about 113 feet. All the islets of this group are of small extent, neither cultivated, nor inhabited. A sunken rock lies about 9 cables eastward of N.E. rock, and another which dries 2 feet at low water springs lies cables west of South rock summit. A depth of 14 fathoms was obtained 4 miles westward of South rock.

Taku-cheku-to.—About 8 miles to the north-east of Ferrières isles are several islands and rocks, the nearest of which are Kheun-pai-oul and Sho-pai-oul. The largest, Taku-cheku-to, 10 miles N.N.E from Sho-pai-oul, is about 5 miles in extent and is both wooded and cultivated. The various channels between the islands of this group have not been explored, but deep water was found south of a line joining South rock of Ferrières isles with Ernest island, a small island 8 miles S.E. of Taku-cheku-to, forming a clear channel southward of the above mentioned group, between it and the Chasseriau bank and rocks, and northward of Fernande island, with depths of 5 to 10 fathoms to the entrance of Salée river.

Tides.—The flood tide commences from N.W., and gradually flows around by the west to about south. The ebb commences from the N.E., and goes by the east to south at the rate of about two knots per hour. Rise and fall of a spring tide is about 20 feet.

Chasseloup Laubat (Sho-pai-oul), about 8 miles E.N.E. from the Ferrières islands, is very irregular in form, uncultivated, and uninhabited; it has two high peaks, the northern being about 500 feet, and the southern 513 feet high. Off the south-eastern end there are a number of detached rocks. The islands to the northward appear to be of the same general character—high, barren, and uninhabited.

Rigault de Genouilly (Seun-tcheup-to), situated about 5 miles E.N.E. from Sho-pai-oul, is irregular, having several peaks, the highest of which is 816 feet; the southern end of this island is steep-to. A rock, which uncovers at low water, lies S. by E., about one mile from the south end of the island.

Chasseriau bank, having only 6 to 9 feet on its two extremes, extends from Bréton islands northward to the Chasseriau rocks (which uncover at low water) and thence eastward about 5 miles towards Auguste island, with an average width of about 1½ miles; both its sides appear steep-to, there being 12 to 15 fathoms near its western, and 11 to 12 fathoms near its eastern edge. It shelters Caroline and Deception bays, and forms with the coast a channel about 2 miles wide, carrying over 12 fathoms, and affording secure anchorage.

Fernande island (Poung To), is about three-quarters of a mile long and rises gradually to a height of 572 feet. It has some cultivation on the eastern side and a small village on the north-east end. A bank of 1½ to 3 fathoms lies eastward of the island, between which and the east shore of Poung To, abreast the village, there is anchorage in 9 fathoms.

OLIVIER ISLANDS consist of six small islands, the largest being about half a mile long. They vary in height, the most elevated being 189 feet, and the south-eastern rock 60 feet high. The northernmost has a rock off its north point, which rises perpendicularly from the sea to a height of about 40 feet. The middle island of the group is the largest, and has a small settlement with a little cultivation. A number of sunken rocks appear about the islands of the Olivier group.

AUGUSTE ISLAND, nearly 4 miles south-east of Poung To, has a peak about 345 feet high, and is apparently large.

Henry island is situated about 3 miles eastward of Auguste. A rocky ledge extends from Henry island toward the small Olivier islands.

Eugènie island (I-pai-to), extends north and south about 1¾ miles, and is about one-third of a mile broad. At its northern end there is a separation extending nearly to the water, almost forming another small island. This portion rises directly from the water, very steep-to, and about 100 feet high. The highest peak of Eugènie island is 275 feet, the surface of the island being irregular; it has no inhabitants and no appearance of cultivation. There is a rocky bank along its western coast, on which is a depth of only about 3 feet at low water, at about one-quarter of a mile from the beach.

Brother rock, about 15 feet above high water, lies half a mile to the north-westward of Eugènie island.

Fournier (Tori islet), 3½ miles eastward of Eugènie island, rises almost perpendicularly on its western side to about 153 feet. It is of small extent, has a yellow sandy appearance, and is surrounded by rocks which are covered at high water. A bank, which dries, extends 2¾ miles south-east from it; and rocks and shoal water for 1¼ miles north-west from it.

Anchorage may be obtained in 11 fathoms, with Brother rock bearing S. by E. ½ E.; Tori island, S.E. by E. ¾ E., and Hat island, N.W. by N. The bottom is very hard, and apparently of a rocky formation, but about half a mile more to the northward there is soft bottom and very good holding ground.

CAPE CHANOINE is the north point of an island (Chanoine) situated on a mud bank which dries at low water, and extends 1¼ miles westward from it; the island is about 3½ miles N. by E. of Tori island; between them is a channel leading into Nam-yang inlet.

Between Tori islet and Eugènie the depths are regular, varying from 16 fathoms in mid-channel to 6 fathoms close to each island. Between Eugènie and the Olivier group the soundings are very irregular, varying from 1½ to 16 fathoms.

NAM YANG INLET, situated 5 miles south-east of cape Chanoine, is an extensive inlet open to the southward and difficult of access, the entrance being rocky and irregular, with the exception of a narrow creek, 5 miles long and dry at low water, near its western shore. It is unfit for a harbour of shelter, or for trade.

MASANFO HARBOUR, situated 2 miles N.E. by N. of cape Chanoine between the main shore and a group of islets east of Lebarbier de Tinan, has at high water the appearance of a commodious harbour, but at low water it is reduced to a creek about a quarter of a mile wide, with extensive mud banks on either side. From cape Chanoine to Tide islet the depths in the centre of the creek vary from 20 to 40 feet. There is a depth of 30 feet abreast Tide islet, north of which it gradually shoals.

LEBARBIER DE TINAN (Iai-bu-to), an island of considerable extent, and irregular surface, is inhabited, and seems well cultivated; the southern point is a steep bluff rising to about 70 feet. Landing here is impracticable, the coast being skirted by a rocky ledge. The remarkable tree on the south-west point of the island is an excellent landmark, and being large and standing alone, it is noticed at some distance.

In the channel between Kien-chan and Lebarbier de Tinan is Rona island. There is deep water in the channel, but the approaches at either end being impracticable render it useless.

KIEN-CHAN ISLAND (Ieun-heung) 2 miles westward of Iai-bu-to, is about 500 feet high, irregular in shape, and steep on its north-western side. It appears well cultivated and water seems abundant; a small stream was seen on one of the hills, coming apparently from a spring. There is a large village on the western side.

Rona bank.—From the south end of the island a bank which dries at low water, and on which are two islets, extends 2 miles to the southward; and shoal water extends thence to the eastward towards cape Chanoine.

Hat island, situated on the shoal bank which extends southward from Kien-chan, at about one mile from the shore, is of small extent, and about 60 feet high.

North and South Watcher's are two rocks, only 3 feet above water at high water, lying on the eastern side of the main entrance to the Salée river; the South Watcher lies 1½ miles northward of Kien-chan island, and the North Watcher is one mile North of the South Watcher.

Cone rock, situated half a mile from the north-west point (shore) of Lebarbier de Tinan is recognisable from its shape, is small in extent, and rises out of the sea to an elevation of 63 feet.

The Haycocks, two rocky islets close together, about 1½ miles north-east of the north-east point of Lebarbier de Tinan, are easily recognized, the eastern one being the smaller.

Edmond island, about 1½ miles south-east from the Haycocks, is reported to be awash at high water.

Grivel island, nearly 5 miles north-eastward of the Haycocks, is 147 feet high.

SOU-HENG-TO, about 3 miles W.N.W. from the north end of Fernande island, is about 228 feet high, and extends about half a mile east and west. The highest peak is near the middle of the island.

Ernest island, 1½ miles southward of Tcheup-to, is of small extent and about 200 feet high.

Jouan island lies between the two former, and is apparently not higher than Ernest, and very little greater in extent.

TCHEUP-TO, one mile to the westward of Adolphe, is about 1½ miles long east and west, and has two peaks, the higher 590 feet.

ADOLPHE ISLAND (Shoi-tcheup-to), 1½ miles to the northward of Sou-heng-to, is of greater extent, and has on the western end a peak about 300 feet high; the island is inhabited.

Kitten rock, lying 2¾ miles N.E. ½ N. from the north end of Fernande island, is just awash at high water neap tides; at high water spring tides, and with a smooth sea this danger may not be seen, and it is consequently very dangerous and should be given a good berth.

Cat island (Tchang-ieum), 198 feet high, situated 1½ miles N.W. by N. from Kitten rock, rises abruptly from the sea, and is of small extent. A rock about 20 feet high lies a short distance westward of this island. There is apparently a good passage between it and Kitten rock.

LAGUERRE ISLANDS are three uninhabited and uncultivated islands of small extent, together with several outlying rocks, lying 1½ miles southward of Humann island.

White rock, a rocky ledge of small extent, lying nearly in the channel, between Kien-chan and Humann islands, serves as a good mark; the white tops of the rocks being easily recognized, and are just visible (3 feet high) at high water.

HUMANN ISLAND (Seum-ei-peul) 1¾ miles westward of Kien-chan, extends in a N.E. and S.W. direction for about a mile, is irregular and hilly, and has no appearance of inhabitants or cultivation. The highest part of the island is about 232 feet elevation.

Philip island, lying to the southward of Richy (Marie Fortunée islands), is 150 feet high. It has a single peak of regular shape.

Louis island, on the north side of Richy, is 168 feet in height.

Round island, 2¼ miles north-east of the North Watcher, is 213 feet in height; its ascent is regular, but there is no cultivation, and only one small house on its eastern side.

Roze island (Olbee), situated 7¾ miles N.E. ½ N. from Round island, is easily recognised; it rises gradually to an elevation of 385 feet, and has on the highest part a clump of trees. The slope on the western side is more gradual than on the eastern, and it has a long low building, apparently of stone, resembling a barracks. On the eastern side is a small fishing village, where a few junks are generally seen. Between this island and the mainland is a passage at high water for junks. The prevailing wind in May and June is from S.W., and blows strong for several days at a time; the barometer fluctuating between 29.70 and 29.80.

Tides.—It is high water, full and change, at Roze island at 4h. 47m. (approx.), springs rise 29 ft. 8 in., neaps rise 24 ft., neaps range 17 ft. 6 in. Velocity of flood and ebb streams 3½ knots. At Whitthall group it is high water, full and change, at 5h. 20m. (approx.), springs rise 24 ft. 3 in.

Bochet island, on the opposite side of the channel, 1½ miles north-west of Roze island, is joined to Yong-jong by a mud flat uncovered at low water, and also appears to be connected by a causeway which is always dry; the island is about 100 feet high, the highest part being on the western end, and is of a yellowish or sandy appearance. There is a wall about 6 feet high running nearly the whole length of the island, probably for the protection of the large village, Ken-ong, on its north-eastern side.

Boisée (Mutchi) island, half-a-mile north-east from Bochet island, is thickly wooded, and from this circumstance can be recognised at some distance as it is the only wooded land to be seen. It is about 129 feet high, and has a wall about 4 feet high running for some distance along the top.

YONG-JONG, a large island, irregular in shape and height (the highest peak reaching an elevation of upward of 1,000 feet) has on its top a clump of trees. It is cultivated, and has several small villages on it. Between Yong-jong and Kang Hoa, 9 miles northward of it, the channel of the Salée river winds between myriads of small islands, rocks, and sand-banks, the depths varying from 5 and 10 fathoms in the narrow passages between the islets, to 2 and 3 fathoms in the wider parts of the channel.

At 10 miles north of Boisée island the channel lies between the eastern shore of Kang Hoa island and the mainland and varies from 2 cables to one mile in width. Rocks and sandbanks fill up a considerable portion of the channel, and the depths in the passages are shoal. The shores on both sides are cultivated with rice, the mainland being hilly, while on the several small salient points along the shore of Kang Hoa are forts. In the narrows, the tidal stream is said to run at the rate of 8 knots an hour at spring tides.

Sang-mou-tchi (Guerriere) island, 1¼ miles N.E. from Mutchi, is about half a mile in length and about 163 feet high, a ridge extending nearly its whole length, the northern end of which is perpendicular, with a gradual slope toward the southern end. The highest peak is nearly in the middle of the island, and has a clump of trees on it. There is a separation at its northern end which leaves a small portion of the island detached at high water.

The high bluff rock-formed islands, rising out of a mud bank, which are seen detached from the land at high water, are connected at low water by extensive mud flats on which it is possible to walk without much difficulty.

Directions. — Approaching Jin Chuen, northward of Moulaku-to island, caution is necessary in crossing the bar between Moulaku-to and Whitthall group. When about one mile south of the south point of Whitthall group, shape a course E. by N. ¾ N., for Philip island, and when the western part of Richy island bears N. by E. alter course to E. by S. ½ S., to pass southward of Round island, rounding it at the distance of three-quarters of a mile. When the latter bears West steer N.N.E. ¾ E. for Roze island. A good mark for this channel is to bring the eastern end of Round island just clear of the western end of Kienchan, and when a clump of trees on Mt. Zoe, the high peak on the mainland bears East, alter course to N. by E., which leads to Jin Chuen anchorage, south-westward of Roze island.

Main approach to Jin Chuen.—With South rock of Ferrières isles bearing North, steer E.N.E. to pass about a mile from Sho-pai-oul,* this course clears the Chasseriau bank, and leads in mid-channel between Souheng-to and Poung-To (Fernande island). South rock appears very different on this bearing, being almost divided by a narrow gorge which reaches nearly to the water's edge, forming a very good mark for changing the course, as it opens very suddenly. The soundings are regular, after passing South rock, for about 10 miles, but when Sho-pai-oul bears N.W.

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* The island of Sho-pai-oul appears to be charted too far northward with regard to Fernande island and Sou-heng-to. Caution is therefore necessary when entering by this route.—Lieutenant R. F. Hoskyn, 1882.

there is a sudden shoaling from 42 to 21 fathoms. When Fernande island bears S.E. by E. distant about 1½ miles, steer E. ½ N. until Cat island bears N.W. by N., when the vessel will be eastward of Kitten rock, and a N. by W. ½ W. course may be steered until Cat island bears W. by S., and the western extreme of Kien-chan N. by E.; thence steer North to pass between White rocks and Kien-chan. The former may be passed tolerably close in 10 fathoms, from which continue the same course until the northern extreme of Marolles bears West, when alter course to N.E. ¼ N., until the North Watcher bears East; thence steer E. by N. ¾ N. to pass between it and Round island, and proceed as before directed.

PRINCE JÉRÔME GULF (A-San anchorage).—This gulf extends in a south-east direction from Eugènie island for upwards of 20 miles. The shoal, not completely examined, the south end of which lies 1½ miles north of Seg-gumee, appears to extend for several miles in the direction of Eugènie island.

Directions.—Proceeding to A-San anchorage vessels may pass in safety on the north side of Eugènie island at a distance of one mile, and when the south point of that island bears West, distant about 2½ miles, a course S.E. ½ S. for the islet (50 feet high) situated on the reef of rocks north of Bagzug reef, will lead in deep water. Pass three-quarters of a mile westward of the islet, to avoid Bagzug reef.

DECEPTION BAY, the entrance to which is about 6 miles westward of Jérôme gulf, owes its name to the deceitful indications of a river which seems to open into the deep and narrow channel terminating it to the south, and in which the depth is about 5½ fathoms. There is excellent sheltered anchorage off the entrance to this channel, but the outer passages to it present great difficulty of approach from being in the midst of islands and surrounded by banks; the greatest obstacle is the strength of the current, which in the inner channel runs 5 knots. The last of the summits of the Table chain overlook the shores of Deception bay and those of Prince Jérôme gulf.

CAROLINE BAY, the west point of entrance to which is in about lat. 37° 0′ N., long. 126° 17′ E., has a safe outer roadstead, carrying about 9 fathoms water, between Alfred peninsula and the Cormandière rock, lying off the west point of the bay. The entrance to this bay, little more than a mile wide, is much contracted by a tongue of sand which uncovers, and beginning at the eastern point of the bay extends three-quarters of a mile westward across the channel; but between the western extreme and the opposite shore there is a channel of 11 fathoms water, which leads to a large lagoon. There are numerous villages on the coast. The tide rises about 26 feet.

JOACHIM BAY.—In steering for this bay, the *Virginie* passed 3 miles north of Tas-de-Foin or Haycock islet, off the entrance of Shoal gulf, and had 11 fathoms in the middle of the central islands of the archipelago. The frigate anchored in 9 fathoms about one mile off the west point of entrance of Joachim bay.

This bay, about 8 miles south-west of Caroline bay, is a large bight which extends to the south-east, and looks from a distance as if it afforded excellent anchorage; but part of its entrance is barred by two reefs, the summits of which are never covered. Having passed eastward of these reefs, through a channel carrying 16 feet at low water, a sheltered anchorage was found in 7 to 9 fathoms, soft mud, abreast a village containing about 4,000 inhabitants.

From hence the remainder of the bight is nothing but a large lagoon, forming to the south-east and east, two bays 4 or 5 miles deep, having a depth of not more than 3 feet in them at low water.

CLIFFORD ISLANDS, three in number, about 200 to 300 feet high, lie about 20 miles off shore in about lat. 36° 44′ N., long. 125° 42′ E. Between Clifford islands and the mainland of Korea are several islands, as yet (1883) unexplored. H.M.S. *Vigilant*, 1882, passed between the Clifford islands and a group about the same size at 3 or 4 miles to the eastward of them; there was no bottom at 25 fathoms, and the channel appeared deep.

MARJORIBANKS HARBOUR.—The *Amherst* (*see* note, p. 50) left her anchorage under Chwang-shan, and steered to the southward; after passing numerous islands, she anchored under the Loktaou islands, about 2 miles from a large village built on the brow of a steep hill, westward of Table mountain. From the Loktaou she steered N.E. 7 miles for another group, and then N.E. towards a passage among numerous islands, where she found sheltered and convenient anchorage near a large village. This anchorage was named Marjoribanks harbour.

The approaches to Marjoribanks harbour are well pointed out by Table mountain, 3,280 feet high, which rises E. by N. $\frac{3}{4}$ N. from the anchorage, but they are studded with islets and rocks, amongst which it is difficult to navigate.

The harbour is described as fronting the mouth of the channel leading into Shoal gulf, and is formed by three islands of moderate size; one to the north-west (Chang-kon-yam), one to the north-east (Ko-tian), and one to the south, and by a small islet, Mauzac, surrounded by reefs to the west. The depth is 8 to 12 fathoms at low water, in the middle of the harbour, abreast the south point of Ko-tian; but north of this, and in line with Mauzac islet, lying off the south point of Chang-kon-yam, the water shoals rapidly to 20 and 12 feet near some rocks awash, which seem to encumber the north side of the harbour. To the southward the depth decreases less rapidly; there are 12½, 6, and 5 fathoms as far as the line which joins the northern point of the south island to the rock above water, which lies one mile W.N.W. of this point. Mauzac islet is in lat. 36° 26¾′ N., long. 126° 28. E.

There is a valley in a bay with a sand beach on the middle of the west coast of Chang-kon-yam, and another village on the north-west coast of Ko-tian. One mile eastward of this latter island is a large island named Roussin, on which there are three villages; it occupies nearly all the entrance of Shoal gulf. The channel which it forms with the south end of Lindsay island is 2 miles long and 1½ miles wide, but it is difficult to navigate, being encumbered with islets and rocks.

A party proceeded to the northward to explore a deep and wide gulf, which was named Shoal gulf. The western side of the gulf was studded with numerous beautiful verdant islets, mostly cultivated and inhabited, and thickly wooded with fine fir timber, many of the trees of which were fit for spars, and the wood of the best quality, close grained, and full of turpentine. In advancing up the gulf it became much wider, at the entrance 5 miles, and 10 miles up nearly double that breadth: the soundings were variable, but 8 to 12 fathoms were carried in the fair channel. The island to the eastward was 2 miles in length, fertile, and with several large villages on it. Having proceeded about 6 miles farther, and the head of the gulf appearing at a great distance, they abandoned the idea of reaching its extremity. and landed on an island which was named Lindsay island.

On ascending a high hill, the open sea was seen to the westward, and Lindsay island was observed to be separated from the mainland by a narrow passage. The head of the gulf was divided into two parts, the western of which extended about 7 or 8 miles to the northward, but the termination of the eastern one, which trends to the N.N.E., could not be seen. A cluster of islands lie in the centre of the gulf, about 10 miles from the entrance.*

SHOAL GULF is described as extending 30 miles in a northerly direction from its entrance. Although its name implies that it is shallow, yet there is an average depth of about 11 fathoms to 25 miles north of Roussin island, which forms the western part of its mouth. All the western part of the gulf, as far as the Mathilde group, in lat. 36° 44′ N. was sounded over by the boats of the *Virginie*, the depth varying from 6 to 10 fathoms.

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* Marjoribanks harbour and Shoal gulf were also visited by the French frigate *Virginie* in 1855.

In the bay north of the group, the soundings were 4 and 5 fathoms, and in the bay E.N.E. of the group 22 to 26 feet near the shore.

The coasting trade is considerable, and its importance to the Koreans is pointed out by beacons, which are kept up with great care, on all the points, and on the shoals which cover at high water.

The general aspect of the shores of the gulf is uniform. Lindsay island is a long range of wooded summits united by chains of rocks, covered at high water. In all the creeks are hamlets and villages, the principal of which are on Roussin island and at port Lourmel. The eastern coast of the gulf, on the contrary, is an uninterrupted series of bare hills, with abrupt declivities, throwing out into the sea their granite bases. Behind these hills are the high mountains of the Table chain, which run in a N.W. and S.E. direction. There are only two or three villages on this coast, but there appeared to be a large population in the interior.

The channel.—Three channels lead into the gulf. The two westward of Roussin island are only practicable for junks. The third must be sought for to the southward of the Marjoribanks islands, Chang-kon-yam, Ko-tian and another, and which, bounding them to the east, carries 6½ to 22 fathoms water, as far as the south-east point of Roussin, where a circular bay, formed by this point and Bouët island offers good anchorage. All the southern part of the gulf between the Parseval group, Roussin island, and the mainland, affords fair anchorage near the shore, especially to the south of Penaud island, where the current runs with less strength than in the gulf. The Parseval are 3 miles north; Penaud 1½ miles north-east of the east end of Roussin.

In proceeding up the gulf the soundings were 9 to 16 fathoms, sand and shells, as far as the Dénudée islands, which lie 10 miles within the entrance. At a mile southward of the centre island of this group, in 8 fathoms, sand, a convenient shelter may be found abreast a creek, where the junks await the change of tide. At 1½ miles N.N.W. of the Dénudées is a flat, 4 cables in extent, and carrying 6 feet water, which must be left to the westward, and the channel taken between it and Lindsay island.

The Mathilde group will now be seen at 6 miles to the N. by E. They divide the head of the gulf into two deep bays, one trending to the north, the other to the north-east. At half a mile south of the most southerly island of this group is a small islet, distinguished by a large white pagoda covered with tiles standing in the midst of trees. At 3 miles S.W. by W. of this islet, and at the same distance from the nearest point of Lindsay island, is another flat of less extent than the former, but carrying the same depth, 26 feet; in proceeding north this also must be left to the eastward, so as to keep in the channel.

Port Lourmel.—From thence, steering towards the north part of Lindsay island, a bight, named port Lourmel, about 1½ miles deep, will be seen to the W. by N., and a large village on the declivity of a steep hill This is one of the most commercial points of the gulf. A channel, carrying 6½ to 9 fathoms, leads to it and forms a sheltered roadstead, the only inconvenience being the currents, which set strongly from a lagoon leading to the westward. This lagoon is only navigable at high tides to the junks, which penetrate some distance into the interior.

Port Lourmel is the limit of the deep soundings, for as soon as the small islet to the north is passed, the depths are irregular, the channel becomes contracted, and not more than 26 feet will be carried for 6 or 7 miles. Here one of the most remarkable mountains of the coast is to be seen; remarkable, inasmuch as it may be recognised in all directions, and that it rises from the centre of three large bays. Its peak is conical, and has three little paps on its summit.

To the eastward of port Lourmel is the entrance of the north-east bay of the gulf, which is open to the south-west. Its high shores seemed to announce deep soundings; not more, however, than 32 feet were found, and at low water a bank, more than 1½ miles in extent, was left dry surrounding Great Mandarin point.

Tides.—It is high water, full and change, at Marjoribanks harbour, at 3h. 30m.; springs rise 29 feet. In Shoal gulf the rise is 26 feet. The tides produce strong eddies, which although they favour the junks, would no doubt be an obstacle in its navigation by a sailing vessel of large draught, particularly with the variable winds of these latitudes.

Directions.—In making for Marjoribanks harbour, the *Virginie* had 27 fathoms water at 2½ miles south of Guérin island, 969 feet high, in lat. 36° 4′ N., long. 125° 50′ E.; from thence she steered to pass 4 miles east of Wai-ian-do island, elevated 1,067 feet, the soundings being 14 and 16 fathoms. After sailing 7 miles eastward of this position she steered to the northward, passing some distance east of Camille, Pellion, and Charner, islands, in soundings of 8 and 10 fathoms, until abreast Haycock islet, in lat. 36° 24′ N., long. 126° 14′ E., and from thence to Marjoribanks harbour.

BASIL or CHU-YING BAY, visited by the *Alceste* and *Lyra,* 4th September 1816, is formed on the east side of a curved tongue of land, on which is a peaked hill. The bay is about 4 miles wide, but it is open to the south, and has not water enough to allow vessels of moderate draught to enter, there being only 2½ to 3 fathom inside the points. The *Alceste* and *Lyra* anchored outside in 5 fathoms.

To the south-west, 5 miles from the west point of entrance, is a peaked islet named Helen island, 930 feet high, which forms a good mark to lead to the bay. The bay is skirted by large villages, ornamented with trees and surrounded by cultivation, both on the mainland and on many of the neighbouring islands, which form a part of the Korean archipelago.

Tides.—In Basil bay, September 4th 1816, the rise of tide, 2½ days before full moon, was 15½ feet; low water at 8h. p.m., and high water at 2h. 30m. a.m., showing an approximate establishment of 4h. 15m., and a rise of 17 to 18 feet at springs.

KOREAN ARCHIPELAGO (southern portion).—This embraces the numerous groups of islands, islets, and rocks skirting the south coast of the Korean peninsula, extending a distance of about 200 miles, from Ross island on the west, to the harbour of Tsau-liang-hai (Fusan) on the east. Nearly all these islands have been surveyed, but some portion of the shores of the mainland are yet (1884) unexplored.

THE KOKOUN-TAU ISLANDS, are high, mountainous, 9 miles in extent, east and west, and about the same north and south, if Peak islet be included. They are separated by narrow channels, and form a mass of bare peaks and arid cliffs. The sea breaks with violence on their rocky points during S.W. gales, and the flood stream runs violently into the passage between the islets. In the interior the points are less abrupt and covered with trees; there are some sandy beaches between the rocky ground, and at the foot of the hills many houses surrounded by cultivated fields.

Camp islet, the easternmost and largest of the group, is 2 miles long, east and west, and one mile wide. Its eastern point, in about lat. 35° 48′ 8″ N., long. 126° 21′ E., is high, and covered with stunted trees; it falls towards the west, where it terminates in broken rocks, and is low; it is not inhabited. On a shingle beach, between two points of rock forming a small bay, the crews of the French ships *Gloire* and *Victorieuse* disembarked on the 11th of August 1847 These vessels found the anchorage on its south side safe during the northern monsoon, sheltered as it is by the lofty mountains on the mainland; but in a S.W. gale, the swell must be heavy, and the anchors would perhaps drag on account of the slope of the bottom from south to north.

The resources of these islands are trifling. The inhabitants are poor; they live on the product of their fishing, and some little barley and rice that they gather in; and they are very mistrustful of strangers. Vessels can obtain good and abundant water at about 2 miles from the anchorage.

Tides.—It is high water, full and change, at Camp islet at 2h. 25m.; the tide rises 20 feet at equinoctial springs, and the range is 10 feet at neaps. The streams follow the direction of the channel, and average perhaps 3 kots an hour.

Saddle island, has a peak at either end, which, seen from the offing, nearly join and give it the appearance of the hollow of a saddle. It may also be known by an islet lying 1½ miles from its north side. In passing the north or south side of the island, the two peaks separate, leaving between them a hollow, which has the appearance of a Turkish saddle. The west peak is in about lat. 35° 36′ 50″ N., long. 125° 56′ E. About 10 miles farther east are two islets lying close to each other.

Directions.—When bound towards the Kokoun-tau group from the westward, it will be necessary first to sight Saddle island, and when 5 miles north of that island and steering East, Peak islet will be seen ahead, and to the north the islands of the Kokoun-tau group will rise one after the other. The flood runs strongly to the northward, and must be allowed for; the soundings will vary from 10 to 3¼ fathoms. At 4 miles north-west of Peak islet is Roche Percée, having a remarkable hole pierced in the rock a few feet above water, and which, when approached from the westward, will be easily perceived. When between this rock and Peak islet, steer N.E. by E., or for the east point of Camp islet, and anchor in 9 fathoms, over a bottom of soft mud, at one mile off shore; the middle of Peak islet bearing S. by W. ¼ W., and the eastern end of Camp islet N.E. If working in, which can only be done with the tide, care must be taken when approaching the east bank off the mainland, for the soundings shoal suddenly from 6 to 3 fathoms.

BARREN ISLANDS, are a desolate looking group of three islands with several islets about them, extending 5 miles in a north-east direction, in about lat. 35° 20′ N., long. 125° 50′ E. On the centre and largest is a conical hill 600 feet high; on the southern are three or four hills, the highest 500 feet; and the northern island is 300 feet high, with cliffs on its north side and two islets off its south-east point.

It would not be prudent to pass between any of these islands in bad weather; the northern passage is broad, but there are two small islets at the northern, and a rock awash off the southern entrance to it. This rock, which uncovers at a quarter ebb, lies 1½ miles N.E. ½ E. of the south-east point (a steep head) of the large island. At half a mile west or S.W. of this point is the best anchorage, in 12 fathoms, sand and shells, should a vessel be driven over to this coast by north or north-west winds ; closer to the point the water is deeper than 14 fathoms. In December 1861 H.M. gunboat *Dove* found fair shelter from a N.W. gale with good holding ground, but much swell.* She passed round the north island at half a mile, which appeared bold-to. There is a great rise and fall of tide.

An islet 20 feet high, and a rock 10 feet high, a mile apart, lie N.W. of the group, the latter at 1½ miles distance; there is also a small rock between these, and another two cables S.E. by S. of the 10 feet rock. About 3 miles E.S.E. of these rocks are two islets, the northern 50 feet and the southern 100 feet high, with several rocks about them of jagged appearance ; the *Dove* passed 2 to 3 cables west of these. There appeared to be no other islands or rocks within 8 or 10 miles of the group. To the north-eastward the soundings decreased suddenly to 5 fathoms, mud, where there was a heavy ground swell, so that the *Dove* was obliged to tack off shore.

MODESTE ISLAND† lies at the north-west extreme of the southern group of the Korean archipelago. It is 3 miles long, N.N.E. and S.S.W., and has two peaks, of which the northern and higher, which attains an elevation of 1,191 feet, is in lat. 34° 42′ N., long. 125° 12′ E. The shores of the island are steep and rugged, rising almost precipitously from the sea, the higher parts being well wooded. A few houses are situated on the south side of the lower ground between the two summits, where there is a small patch of cultivation.

Within a radius of one mile from the north-west point are several small rocks and islets, the most northern of which is 178 feet high.

Westward of the south part of the island, and at 2 cables from the shore is a pinnacle rock about 100 feet high, conspicuous when viewed from the northward or southward.‡

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* Several small Korean boats (? fishing boats) were riding out the gale at a mile from the shore under the lee of the islands ; probably the water is shallow there.

† *See* Admiralty charts:— North-west Pacific ocean, No. 2459 ; scale, $d = 0{\cdot}75$ of an inch ; Hong Kong to Liau-tung gulf, No. 1262 ; scale, $d = 2{\cdot}0$ inches.

‡ The description of the western groups of the Korean archipelago is principally by Navigating Lieutenant Pearce and Lieutenant R. Hoskyn, R.N., 1876–7.

MACKAU GROUP, about 8 miles east of Modeste island, consists of several islands and rocks extending 8¼ miles in a N.N.E. and S.S.W. direction. There are many tide rips in the neighbourhood of this group, which probably indicate irregular depths, and should therefore be avoided when seen.

Mackau island, the principal and highest island of the group, 1,328 feet high, is 5 miles long N.E. and S.W., and 2 miles broad. A chain of hills rising abruptly on the west side, extends through the length of this island, terminating at the north end in Amphitheatre range, which overlooks the chief town (Bacsanto) and St. John harbour.

Anchorage.—On the west side of Mackau island, sheltered from easterly winds, good anchorage will be found for large vessels in 7 fathoms, mud, with the south end of Modeste island in line with the south point of West island bearing West; and Venancourt rock (127 feet high) in line with the west point of Mackau island bearing S. by W. ¾ W. Small vessels could lie nearer the shore in 5 fathoms water.

St. John harbour, circular in form, nearly a mile in diameter, and 4 cables wide at its entrance, is open only to north-east winds; there are depths of 2¼ to 4 fathoms, mud, in the harbour. On the north-west side of the entrance are two islets (Eagle islets), the eastern 204 feet, and the western 222 feet high, their western sides rising perpendicularly from the water; the western islet is nearly joined to Mackau island by numerous rocks. About 1½ cables north of the eastern islet is a cluster of rocks, the highest of which is 75 feet high. At 1¼ cables from the south shore of the harbour are two rocks, near each other, which dry 4 and 6 feet respectively.

Observation islet, 45 feet high, and about 360 feet in extent, lies one cable from the west shore of St. John harbour. The observation spot on the summit of this islet is in lat. 34° 41′ 40″ N., long. 125° 25′ 54″ E.

Anchorage.—A good berth is in 3¼ fathoms, mud, with the summit of Observation island in line with the north-west peak of Amphitheatre range bearing W. by N. ¼ N., and the eastern extreme of Eagle islets N. by E. ¾ E.

East island, 770 feet high, and wooded, lies about one mile east of Mackau island; its west side is indented with two small bights, and the east side is composed of cliffs. Near the north-east point of East island, is an islet 60 feet high, and at 1¼ cables N. ¾ E. from this islet is a rock that dries 4 feet at low water. About half a mile eastward of East island there is a sunken rock, with 3 fathoms over it, and 12 to 28 fathoms close around. From the rock, the islet off north end of East island bears N. 33½ W., and south extreme of East island S. 73½ W. The channel between East and Mackau islands was not examined; no dangers however were seen from the boats of the *Sylvia.*

West island, 896 feet high, lies three-quarters of a mile from the west side of Mackau island. When viewed either from the north-east or south-west, the peculiar perpendicular fall of the summit shows prominently; the middle part of the island (a sharp peak 520 feet high) is joined to the southern part by rocks covered at high water, and to the northern part by a spit also covered at high water. A village is situated on the north-east side of the southern portion of West island, and a clump of trees and a few houses on the northern portion of the island; there are also off the north-west point a few detached rocks above water, and off the north point are two round islets 110 and 100 feet high. The channel between West and Mackau islands should only be used by small vessels, as a bank extends nearly across. Bluff island summit in line with the north-east point of West island, bearing N. by E. ¾ E., leads through the deepest water.

Bluff island, 386 feet high, small and wedge shaped, is a good mark to steer for when approaching Mackau group from the north and west; it is steep-to on all sides, and may be passed at one cable distance.

Wooded island, on the north side of Mackau island, is half a mile long, N.N.W. ¼ W., and S.S.E. ¼ E., 300 yards broad, and 360 feet high. Its wooded peak is conspicuous when seen from either the eastward or westward. At two-thirds of a cable west of the north point of Wooded island is a rock which uncovers 6 feet at low water. Wooded island has on either side a navigable channel; the southern is 3 cables wide and clear of danger, and the northern is 4 cables wide with a rock (Danger rock) lying in the fairway.

This island from its situation protects St. John harbour from winds to the eastward of N.E.

Danger rock, covered at half tide, lies 3⅓ cables E. by N. ¾ N. from the north point of Wooded island, and 3¾ cables S.E. ½ S. from the outer rock off the south point of North-east island.

The north-west peak of Amphitheatre range in line with north end of the 75 feet rock (at the entrance to St. John harbour), bearing W. by S. ¼ S., leads 1¾ cables north of Danger rock, and midway through the channel between North-east and Wooded islands; the same peak in line with the north point of Wooded island bearing W. ¾ S., leads three-quarters of a cable to the southward; the west point of East island in line with the south-east point of Wooded island bearing S. by W. ½ W., leads 1½ cables to the eastward; and the islet near the north-east extreme of East island in line with the south-east point of Wooded island bearing S. ¾ E. leads three-quarters of a cable to the westward.

North-east island, immediately to the northward of Wooded island, is 1¾ miles long, nearly a quarter of a mile broad, and 540 feet high; near the north and south extremities of the eastern point are two remarkable conical rocks, 100 and 90 feet high respectively. The northern shore of the island is bold and the summit is over the east point; off the south point there are two small rocks, the northern 28 feet, and the southern 23 feet high.

North island, the north-western island of the Mackau group, is recognised by a sharp peak 430 feet high immediately over its west point. Between North and North-east islands, lies Passage island, 336 feet high, the channels on either side of which are obstructed by numerous islets.

Double islands, the most northern of the group, are two islands about 300 feet high, similar in shape and appearance, lying in an east and west direction from each other, with a boat channel between. Off the north-east point of the eastern island are a few rocks, the outer of which (Pillar) is perpendicular and 143 feet high. In the narrow channel between Double islands and North island is a small islet 157 feet high, and several rocks which completely block the channel.

Two small clusters of rocks, having deep water around them, lie respectively 4¼ cables and one mile to the eastward of Double islands, the highest of the western cluster is 56 feet, and that of the eastern 95 feet high. A depth of 21 fathoms was obtained 2 cables eastward of Pillar rock, and 16 fathoms 2 cables westward of the eastern cluster of rocks.

Sylvia rock, on which the *Sylvia* struck during the survey in 1877, lies 3¾ miles N.E. by E. ½ E. from Pillar rock, and has less than 6 feet water on it, with 10 to 21 fathoms close around.

Sharp islet, 150 feet high, is situated about 17 miles eastward of Double islands, in lat. 34° 47′ N., long. 125° 46′ E.

Directions.—Vessels bound to St. John Harbour from the westward, should steer towards Bluff island, passing it on either side; then steer for the north point of Wooded island until past the 75 feet rock, when the harbour will be open.

From the eastward, north of Wooded island, keep the west end of East island in line with the south-east point of Wooded island bearing S. by W. ½ W., until the north-west peak of Amphitheatre range is in line with the north end of the 75 feet rock bearing W. by S. ¼ S., when steer to the westward with this mark on until past Wooded island, whence a course may be shaped for the harbour.

The best channel is that to the southward of Wooded island, it being free from danger; in the narrow part, however, a rock which uncovers 4 feet at low water spring tides, lies one-third of a cable north of the West entrance point of this channel.

Tides.—It is high water, full and change, at Mackau islands at 1h. 30m.; springs rise 10¾ feet, neaps 4 feet. The flood stream sets to the northward, and the ebb to the southward, about 5 knots at springs, during which time the channels on either side of Wooded island must be approached with caution. Overfalls are visible occasionally for some considerable distance westward of West island.

VENANCOURT ROCK, lying N.E. ¾ N., 4 miles from the north island of Hydrographer's group, is round-topped and barren, and is 127 feet high.

A depth of over 30 fathoms was found all round and close to the rock.

HYDROGRAPHER GROUP, consisting of three long looking islands, with three smaller ones off their north end, form a crescent concave to the east about 5½ miles in length, the eastern points of the north and south islands being in a N. ¼ W. direction. The three southern islands are from one to 2 miles in length, and of nearly uniform height (400 to 500 feet), so that when seen from a distance they have a smooth and level appearance. Of the remaining three the two northern are each about one-third of a mile in length and 350 feet high; their sides being precipitous and their summits covered with vegetation. The remaining island is a mere rock 180 feet in height, partially covered with brushwood. Between the southern island, which is the largest and highest, and the other four which are all connected by reefs, there is a clear passage 8 cables wide.

The passages between the other islands should not be attempted. In the channel, which is of irregular form, are two bays, one on the north side, the other on the south, and close to the eastern extreme of the channel is a small islet 150 feet high.

The islands are but thinly populated, and the soil poor; wheat, millet, and barley appearing to be the only produce.

Anchorage.—The north bay is well sheltered from all but north-easterly winds, and affords secure anchorage for small vessels in 6 to 10 fathoms, mud bottom.

Supplies.—Fish may be obtained with the seine on the sandy beach in North bay. No good water has been found.

Patch rock, so called from having a conspicuous vein of white quartz running diagonally through it, lies 5 cables N. by E., from the east point of North bay; it is 74 feet in height, and being steep-to all round may be passed on either side.

North-west rocks.—The north extreme of the group is a bluff, and 7 cables N.N.W. ¾ W. from it are two small rocks, close together, which uncover 3 feet at low water. Both bluff and rocks may be passed safely to the north-eastward at a mile.

Tides.—The westerly stream sets strongly across the northern extreme of the group. H.M.S. *Dove*, 1864, steering a N.W. by N. course, had to haul up North to clear the bluff and reef.

Havergal rock, a dangerous rock, awash at low water, lies 1¾ miles S.W. by W. ½ W. from the north point of the south Hydrographer island. Venancourt rock in line with the north extreme of the group leads to the westward of the rock; and the north point of South island in line with Patch rock leads northward of it.

REILLE ROCK, lying 4½ miles S.W. ¾ S. of the south point of the Hydrographer group, consists of two sharp pinnacles and some smaller rocks all close together. The eastern pinnacle, 180 feet high, is the highest, the western rock being about 60 feet in height. A depth of from 20 to 30 fathoms was found close-to all round it.

SINGLE ISLAND, is one-third of a mile long north and south, and rises perpendicularly from the sea on its north-western side to a height of 480 feet, sloping towards its southern point. The upper part is covered with vegetation. Close off its north point is a small rock above water.

The tidal current is very strong in the vicinity of Single island.

MAURY GROUP, in lat. 34° 12′ N., long. 125° 30′ E., consists of three islands, the summits of which are generally seen from a long distance, the western being about half the height of the others. The north-eastern island, 606 feet high, is the highest of the group, the peak bearing about E.N.E. from the summit of Ross island, from which it is distant 20 miles; this island is about one mile in length, W.N.W. and E.S.E., and is somewhat in the form of a large headed hammer, having its head to the westward. The peak is over the north end of the island. The islands rise abruptly from the sea and appear bold-to, but along their north-eastern side at a distance of from 3½ cables to 1½ miles, are four large rocks, the three eastern lying nearly in line, bearing N. ¾ E. from the eastern island, distant 1¼, 1¾, and 2¼ miles respectively; the middle of the three is a sharp double-pointed rock, the highest part of which is 98 feet above the sea. One mile W.N.W. from this rock and 8 cables N.N.E. of the north end of the Maury island is a fourth rock 74 feet high, with a flattish top. To the west of Maury island, and close to it, are two islets 135 feet and 223 feet high respectively.

Small vessels may obtain protection from all winds except from north to east in the north-east bay. The only dangers are two small rocks close together, which uncover 4 feet, and lie 4 cables east from the north point of Maury island. A small village is situated in this bay. Barley and millet are cultivated in small quantities, but no supplies of any description can be obtained, neither is there any good water on the island.

ROSS ISLAND, in about lat. 34° 5′ N., long. 125° 6′ E., is 3¾ miles long N.W. and S.E., one mile broad, and marks the south-west limit of the Korean archipelago; its summit 1,905 feet high is situated at one-third from its north-western end. The greater part of the island is densely wooded, and its north-west and south-east points have high bluffs, and the coast is steep and cliffy all round with the exception of a small bay at the south end, which has a dark shingle beach where the principal village is situated, containing about 60 or 70 houses. Two other villages stand on its western and eastern slopes, the eastern being the larger, but they are difficult to discern.

At 5 miles north of the island there is a depth of 48 fathoms, broken shells; 51 fathoms, sand and mud, at the same distance west; and 40 fathoms, soft mud, a mile south.

Three rocks.—Three large rocks, extending in a line nearly a mile East, lie at 1½ miles N.N.W. of the north-western head of the island. The centre rock, which is the largest, and is 440 feet in height, is visible upwards of 25 miles.

The eastern is 230 feet high, and the western somewhat smaller. About half way between the eastern rock and the north point is a pinnacle 85 feet high.

Almost in the centre of the bay, formed by the south-west side of the island, and about half a mile from the shore, is a rock 25 feet high; and again half a mile south-west of this rock is another which uncovers at low water. Vessels should not attempt to pass between Ross island and the off-lying rocks.

CRAIG HARRIET GROUP, consisting of three small islets, (appearing as one island when seen from the south-west) extends over about 2½ miles, in a N.N.W. and S.S.E. direction; the centre islet is the highest and has a flat peak about 441 feet in height. The eastern islet is round.

West pinnacle, a remarkable perpendicular barren rock, lying 3 miles westward of Craig Harriet, is 157 feet high. It is very conspicuous when viewed from the westward, and it may be passed at one cable's distance. West pinnacle is the outer of the numerous islands and rocks south-west of Murray Sound.

East Pinnacle, an islet 174 feet high, lies three-quarters of a mile east of the eastern extreme of Craig Harriet. It is partially covered with grass.

Salamis reef, a dangerous sunken reef, on which there is a depth of only 4 feet, with depths of from 16 to 25 fathoms at a short distance around it, lies S.W. ¾ S. from the northernmost Craig Harriet island, and S.E. by E. 1½ miles from West Pinnacle rock.

SYLVIA GROUP, 2¼ miles E.N.E. from Craig Harriet, has not been examined, but the two principal islands are higher and larger than any of the Craig Harriet group; the western island has a sharp peak over its north-west point.

LYRA ISLAND, in lat. 34° 9′ N., long. 125° 56′ E., 4½ miles S.E. by E. from the south extreme of Craig Harriet, is 1½ miles in length (north and south), and is almost divided into two islands. The northern part is 426 feet in height, the southern 418 feet, the opening between them being only visible from the south-west, and appearing, when first seen from that direction, like two large boulders. Lyra island has a remarkable appearance, no other island in the locality bearing any resemblance to it, being rugged, craggy, with vertical cliffs, and presenting a serrated ridge somewhat resembling a cock's comb. It is steep-to all round.

Tides.—The tidal streams in the vicinity of Lyra island attain a velocity of nearly 6 knots an hour at springs.

NIMROD ISLAND, forms the south-east side of Murray sound; over its southern point is Maxwell peak, a sharp peak 685 feet high, to the westward of which is a rocky summit with two humps on it, which are conspicuous when making for the entrance of Murray sound from the south-eastward; close off the south point of the island is a small rock above water which may be passed at a distance half a mile.

SOUTH ISLAND, between the Sylvia group and Nimrod island, and 4¾ miles N.E. by N. from the north point of Lyra island, is a small island with a flat summit. Half a mile to the northward of the island is a triangular-shaped rock (Entrance rock), 50 feet in height. South island marks the south entrance to Murray Sound.

MURRAY SOUND, the southern entrance to which is about 8 miles eastward of the Craig Harriet group and about 5 miles northward of Lyra island, extends in a N. by W. direction from the south-west point of Nimrod island for about 8 miles, in the direction of Thistle island. The *Lyra* passed round the northern end of Thistle island (to avoid some reefs seen off its southern point) in 17 to 10 and 11 fathoms with one cast of 9 fathoms, and anchored at 2 cables from the middle of its east side in 11 fathoms soft bottom.

The islands on the western side of the southern part of the sound, the principal of which are, Pearce, Swinger, Wheeler, and North islands, have been examined; but Thistle island on the west side and the shores of Montreal and Nimrod islands forming the eastern side of the sound are as yet unexplored.

Two prominent peaks mark the eastern part of the sound, Maxwell peak (Nimrod island) which has a very sharp summit, and which is N.E. ½ E. 7 miles from Lyra island; and Boulder peak, 880 feet high, the highest land in Murray sound, situated 3½ miles N. ¼ W. from Maxwell peak.

PEARCE ISLAND, the south-west island of Murray Sound, 1¾ miles eastward of the Sylvia group, is nearly 2 miles long, of irregular shape, and has over its north-west point a sharp peak rising abruptly on its west side to a height of 607 feet; near the summit is a landslip, visible from the westward. The salient points of this island are steep-to, and may all be passed at a distance of one cable. The eastern extreme of Pearce island, at high water, forms two small islets, the outer of which is 147 feet high.

The channels on all sides of Pearce island are navigable, that on the north side, between it and Seal island is, however, only one-third of a mile wide. In the channel on the east side are two small rocks named Channel and Centre.

Anchorage.—In a bay on the south-east side of the island fair anchorage may be obtained in 5 to 10 fathoms, sheltered from winds between N.E. by N., round by north to S.W. by S., a good berth being midway between the entrance points, with Channel rock bearing E.S.E., and Boulder peak just open of the north-east point of the bay.

Anchorage may also be obtained in a bay on the north-east side of the island, sheltered from south-west winds. The bay is narrow, and shoal water extends some distance from its head, suddenly shoaling from 5 fathoms. Vessels should anchor north of Centre rock, in line with the east point of the bay bearing E. by S. ½ S. A good berth is in 7 to 10 fathoms with Maxwell peak in line with the east extreme of Pearce island bearing S.E. ½ S., and the east end of Round island bearing N. by E. ¾ E There is a village on the western shore of this bay.

Tides.—The strength of the tidal streams is felt in these bays, causing them to be uncomfortable anchorages when blowing hard.

Channel rock, situated about three-quarters of a mile E. ½ N. from the south end of Pearce island, is a small rock about 50 feet in height, with deep water around it. At 3 cables S.S.W. ½ W. from the rock is a patch of 3¾ fathoms.

Centre rock, N.N.E. ¼ E., three-quarters of a mile from Channel rock, is a rocky cluster one cable in extent, the highest part of which is 23 feet above high water. A berth of a quarter of a mile should be given to this rock in passing it on either side. In the centre of the channel between Centre rock and Pearce island is a depth of 8 fathoms.

Seal island, situated about half a mile north of Pearce island, is half a mile long (east and west) and has two peaks of nearly equal height, the western of which is 245 feet. There is a small village on the north-east side of the island.

Dangers.—The western point of Seal island is foul, and two clusters of rocks that cover at high water spring tides, lie off it; one 2 cables west from the west side and the other 1¼ cables south. As deep water exists just outside these clusters it is advisable to give them a wide berth. When passing the north point of Pearce island keep within 2 cables of it, or if going through the channel west of Seal island which is half a mile wide with a depth of 4½ fathoms in the centre, keep a small wooded islet, 35 feet high, on a N.E. ¾ N. bearing. Maxwell peak in line with the east extreme of Pearce island bearing S.E. ½ S. leads three-quarters of a cable south-westward of these clusters.

Round island, 1¾ cables eastward of Seal island, is small, and as its name implies, circular in form, its highest point being 110 feet above the sea. A small rock above water, steep-to, lies one quarter of a mile south-east of Round island; and 4½ cables eastward of Round island is the eastern point of Boulders island.

There is deep water in the channels on either side of Round island.

Swinger island, 393 feet high, lies half a mile north-west from Seal island; off its south-east point the water shoals for 1½ cables from high water mark. There is a village on the north-east side of the island.

Wheeler island, the summit of which is a sharp peak 573 feet high, lies immediately north of Swinger island, the channel between them being narrow and shoal. There are two villages on the island.

Entrance island, 3½ miles westward of Swinger island, is a small, round islet, a short distance westward of which is a cluster of rocks above water. Between Entrance and Swinger island are several islets not examined.

Entrance island is a good mark to steer for when making the west entrance to Murray sound from the north-west, taking care to give it, and the rocks westward of it, a berth of three quarters of a mile.

Tiny rock, an isolated rock, about 5 feet high, lies 2¾ miles north of Entrance island.

Caution.—The numerous islands north-east of Tiny rock are unexplored, and vessels should, therefore, keep to the westward of Tiny rock and Entrance island.

Wooded islet, a small islet, 35 feet high, lies 6 cables eastward of Swinger island; it is steep-to and in the channel between them there is deep water. There is also a navigable channel, 4½ cables wide, on its east side.

Flat island, N.W. ½ W. half a mile from Wooded islet is 1¾ cables in length, and 50 feet high. There is deep water round it, and in the channels on either side.

North island, situated in the northern part of Murray sound, 1¼ cables from Wheeler island is 455 feet in height and presents a very rugged appearance. The channel south of the island is shallow, but between its east side and Montreal island there is deep water.

Square rock, 35 feet high, and steep-to lies in mid-channel. The islets northward of North island have not been explored.

MONTREAL ISLAND.—The summit of Montreal island, on the eastern side of Murray sound is 880 feet high. Immediately south of this peak is the entrance to a channel in which anchorage may be found in from 4¼ to 15 fathoms at 2 cables from the shore on either side. The channel has not been explored beyond a distance of 7 cables from the entrance.

Tides. — It is high water, at full and change, in Murray sound at 0h. 17m.; springs rise 10 feet. The flood stream sets through the several channels in a northerly direction, the ebb to the southward; their strength varying from 2 to 4 knots.

Directions.—From the southward, from abreast the north point of Lyra islands, steer to the north-eastward with that point bearing S.W. ¼ S. This course (N.E. ¼ N.) continued for 5 miles will lead a vessel midway between South and Nimrod islands. When the former bears West, alter course for the east end of Pearce island bearing N. by E., and if intending to anchor in the south-east bay of that island, alter course to the westward for that anchorage when Channel rock is on the starboard beam. If bound for the north-east bay, round its east point at 2 cables distance, continuing to the north-westward along the shore of the island at the same distance from it, until the bay opens out, when anchor as before recommended (*see* page 76).

If wishing to anchor southward of Montreal peak—when abreast the east point of Pearce island, the vessel may, if the tide be fair, pass between

Seal and Round islands; but should the tide be setting strong to the southward, it would be advisable to steer N. ¼ W. and pass through the channel eastward of Round island, and the small rock south-east of it. When abreast Round island continue to the N.N.W. passing on either side of Wooded and Flat islands. When the channel south of Montreal peak opens out, haul to the eastward, and anchor due south of the peak, at 2 cables from the shore on either side of the channel.

Approaching MURRAY SOUND from the westward, the only known entrance is between Sylvia group and Entrance island, where the channel is 2¼ miles wide. From Single island the course up to this entrance is N.E. by N. distant 18 miles, passing three-quarters of a mile westward of the small rocks near Entrance island. West pinnacle (Craig Harriet group) bearing S.W. ¼W. also leads up to the entrance. When between Entrance island and Sylvia group steer towards Boulder peak, which will be seen bearing East and just open south of Seal island; and if intending to proceed into the north part of the sound continue with the above mark on, until the small wooded islet (35 feet high) eastward of Swinger island, is seen in the centre of the channel between Swinger and Seal islands, bearing N.E. by N. Alter course for this islet, keeping it on the same bearing; this course will lead one cable westward of the rocks (covered at high water spring tides) situated 2 cables westward of Seal island west extreme; and through the channel in 4½ fathoms at low water.

When nearing the wooded islet alter course to the northward to pass about a quarter of a mile westward of that islet, and on either side of Flat island, and, when the channel south of Montreal peak opens out, haul to the eastward for the anchorage.

CAUTION.—Great care is required when passing through the channel west of Seal island with a strong tide, as it is then difficult to keep the wooded islet on the bearing (N.E. by N.) to clear the rocks off Seal island, and the foul ground off the east point of Swinger island; and in that case it is better to proceed south of Seal island, and to the northward through the channels on either side of Round island. The water in Murray sound is always thick, which prevents sunken dangers from being seen.

Climate.—During the stay of H.M.S *Sylvia* in this portion of the Korean archipelago in August 1876, it was observed that the temperature of the sea in Murray sound was often 10° lower than that of the open sea, causing dense fogs to be of frequent occurrence. In the latter part of June, and during the whole of July, light southerly winds, varying from between east and south-west, were found to prevail, and were frequently accompanied by fogs, which are extremely dense and laden with moisture, and often last for several days in succession. During the first half of August they occurred less frequently.

Tides.—The tidal streams amongst the islands forming the south-west portion of the Korean Archipelago are strongly marked; their general direction is N.N.W. and S.S.E., running about six hours each way at spring tides; the change of stream occurring at about 1¾ hours after the time of high-water at St. John harbour, Mackau group. At the western extreme of the archipelago the velocity of the tidal stream is from 2 to 3 knots an hour, but in the neighbourhood of Craig Harriet it is upwards of 5 knots an hour. The direction and velocity of the tide, however, in the vicinity of the islands is much influenced by the configuration of the land, often causing tide-rips off the salient points.

At neaps the stream is not so regular in its period, being greatly influenced by the direction and force of the wind at the time; its velocity too is much lessened and is only about one-half its rate at spring tides. In the neighbourhood of Murray sound the water is of a muddy colour, and cold; and isolated patches and streaks of this water have been observed as far westward as Hydrographer and Mackau islands, in which locality the water is generally very clear. These patches often resemble shoals.

Virginie (Flat Saddle) island, the eastern island of the group, is in lat. 34° 13′ N., long. 126° 9′ E., appearing as a flat saddle when first seen at 20 miles to the south-west.

LEVEN REEF, nearly awash and on which the sea breaks heavily, appears to be about half a mile in extent east and west: it lies E. by S. ¾ S., distant about 11½ miles from the Lyra group, in the fairway of navigation between those islands and the Bate group.

The SOUTH-WEST COAST of KOREA, and the islands lying off it are now well known, with the exception of some portions of the mainland and inshore groups. The passages between the islands have been traversed by many vessels, and all the outer groups fixed with precision. H.M.S. *Lyra* passed southward along the inner groups, rounded Windsor Castle, a remarkable peak resembling a tower or tall chimney, and stood to the south-eastward into the northern part of Murray sound, anchoring under the east side of Thistle island (page 75.)

The French frigate *Virginie* vainly tried to penetrate the archipelago to the northward of Murray sound; it was hoped that a passage would be found to the north-west across a gulf (Washington gulf) that seemed to belong to the mainland. The bottom was regular, the depth more than 16 fathoms, and the frigate had nearly reached the end when she was brought up in lat. 34° 32′ N., long. 126° E., by a bank stretching ahead from N.W. to the land. The boats could find no passage, and the vessel was obliged to return. In returning to the southward she passed eastward of Virginie island, and then stood to the westward between the Lyra and Nimrod islands. The *Nimrod* also passed through the latter channel.

WASHINGTON GULF is bounded on the west by Lagravière peak, 1,506 feet high, which will be recognised by the peculiar hooked nose shape it presents when viewed from the south and eastward. The peak is in about lat. 34° 24′ N., long. 126° 14′ E.; and 7 miles N.E. from it is Needle hill, the sharp pointed summit of which, 1,381 feet high, shows out very distinctly. At half a mile westward of the Needle summit is another mountain 1,641 feet high.

Smooth Top hill, on the southern part of the eastern shore of the gulf, is 349 feet high, and distant 12 miles E. by S. $\frac{1}{4}$ S. from Lagravière peak. Off its south side, and separated from it by a narrow channel, is an island of nearly the same height. From Smooth Top the eastern shore trends in a northerly direction for 10 miles to the head of the gulf, which is 4 miles wide. There is little wood on either shore, excepting on an island not yet surveyed, lying under Lagravière peak.

There is a channel to the north-west between the islands (of which Lagravière peak is on the southern and Needle hill on the northern) on the west side of Washington gulf, extending about 15 miles towards Amherst island, but this arm of the gulf has not been explored.

South Double island, about 250 feet high, and bearing W.N.W. 4 miles from Bluff cliff, may be said to be the southern island in the gulf. N. by W. $\frac{1}{4}$ W. $3\frac{1}{4}$ miles from Bluff cliff, and N.E. by E. $\frac{1}{2}$ E. 3 miles from South Double, is a rock 6 feet above high water, with 11 and 15 fathoms on either side.

North Double island, is $2\frac{1}{2}$ miles N.N.E. $\frac{1}{2}$ E. from South Double.

The Deserted islands, lie in the entrance of the gulf, the highest and southern, 258 feet high, bearing S.E. $\frac{1}{4}$ S. 5 miles from Lagravière peak. There is a good boat harbour formed by it and the island off its north side.

The Family group, are on the west shore of the gulf, N.E. ¾ N. 6 miles from the Deserted islands. The northern, largest, and highest island, is 303 feet high. On the eastern side are 5 and 6 fathoms, but to the westward the water suddenly shoals.

The Green islands, five in number, extend 3 miles in a N.N.W. and S.S.E. direction in the middle of the upper part of the gulf. The southern or highest has on the eastern side a summit 186 feet high.

Anchorage.—There is no shelter in the middle of Washington gulf, with southerly winds between S.W. and S.E.; but with those from the northward, between West and East, excellent shelter will be found in 5 to 7 fathoms good holding ground. The *Swallow* during her fortnight's stay, anchored at one third of a mile off the eastern shore of the Green islands in 3 fathoms, with only room to swing clear of a 2-fathom bank of large extent lying to the eastward.

Water can be obtained under the hill, 675 feet high, bearing East from the north extreme of the Green islands; also on the west extreme of Thornton island, Bate group.

Tides.—It is high water, full and change, at the Green islands, Washington gulf, at 11h.; springs rise 12 feet, neaps 8¾ feet. About the Bate group the streams attain a velocity of 5 knots at springs, and near the islands the overfalls are very dangerous for boats. The flood sets to the westward, the ebb to the eastward. Approaching Washington gulf the streams somewhat slacken, the rate being 3 to 4 knots between Josling island and Craig Nicoll. In the gulf the flood sets in a north, the ebb in a south direction, but the rate seldom exceeds 2 knots.

LONG ISLAND GROUP, consists of five small islands, the northern and highest of which, 276 feet high, lies 4 miles W. ¾ N. from Josling island, off the western entrance of Kuper harbour. A short distance off the north-east end of this island is a small islet, between which and the point terminating the Saw Tooth range, is a channel of 15 fathoms water. The other four islands of the group greatly resemble each other.

The TWINS are two rocks about 15 feet high, from which the highest part of the northern island of the Long island group bears N.E. by E. ¾ E. distant 3 miles.

BLUFF CLIFF ISLAND, 225 feet high, is the centre of a small group, and bears N.W. by N. 8 miles from Race point, the south-west extreme of the Crichton group, and W. by S. ½ S. the same distance from Josling island. A little more than a mile West of it is a similar island, 280 feet high; and to the eastward, the same distance, is a low flat island with two detached high-water rocks off it to the south-east.

BATE GROUP,* consisting of small islands, islets, and rocks (about 20 in number) may be said to lie within a square, the sides of which are about nine miles in extent. The summit, 517 feet high, of Thornton island, the largest, highest, and central island of the group, is in lat. 33° 57′ N., long. 126° 18′ E.

Sober island, 470 feet high, and the second largest of the group, is separated from the west extreme of Thornton by a narrow channel.

The Nine Pin rock, 149 feet high, is distant 5 miles in a S. ¼ W. direction from the summit of Thornton. There are 44 fathoms water within a mile of its north-eastern side.

The Bott rock, is 3 miles S. by E. ½ E. from the summit of Thornton; its northern part being 404 feet high and falling perpendicular to the sea, gives this islet a most striking appearance, and makes it the indicating feature of the Bate group.

The South Black rock, 61 feet high, is 4 miles S.E. by E. from the summit of Thornton. A vessel can approach its northern side to within half a mile, when standing for the anchorage off the northern shore of Thornton.

Whale island is the northern boundary of the group. It is a little more than a mile long, east and west, a quarter of a mile broad, and off its east and west ends are detached high-water rocks. Its most elevated part, 487 feet high, is on the eastern end.

Ripple island, 317 feet high, is the westernmost of the group. Nearly midway between it and Whale island is a rock awash at high water.

The Swallow rock, with only 6 feet on it at low water, lies about one-third of a mile off the western part of the north shore of Thornton; and from it the summit of that island bears S.E. by S. distant one mile, and the summit of Sober island W. ¼ S. one mile.

It is recommended not to pass amongst these rocks and islands unless pressed for shelter, for large clusters of rocks and reefs lie on their eastern side, and encumber the channels.

The tides run strongly by the northern island, upon which both eastern and western streams seem to press. At half flood the stream was setting strong to the E.S.E. The northern island should be passed if close by, on an East or West course. From the eastward the islands appear all in a row, stretching north and south with the largest island in the middle.

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* From the remarks of Navigating Lieutenant G. Stanley, R.N.

Anchorage. — A vessel seeking shelter amongst the Bate group would in all probability anchor about half a mile off the north shore of Thornton island, at about one-third of a mile eastward of the Swallow rock, with the summit of the island bearing South. This anchorage cannot be called good, as the water is deep, 12 and 14 fathoms, over rocky bottom. Steering for it from the westward, pass between Ripple and Sober islands; from the eastward, pass south of the north-east islet, about 150 feet high, or north of North Black rock, or north of South Black rock.

FLOWER ISLAND, 203 feet high, situated 4 miles N.E. from Sea rock, may be distinguished from it by the flat top which it assumes from all views. The least depth obtained in the passage between these islets was 35 fathoms, mud.

SEA ROCK, the southernmost islet of the Korean archipelago, is in lat. 33° 42′ N., long. 126° 17¾′ E.,* and distant about 13 miles in a north direction from Roberton point, Quelpart island. It is 160 feet high, pinnacle shaped, rises abruptly from the sea, and the water is deep (50 and 70 fathoms), close around it.

QUELPART ISLAND, about 40 miles long E.N.E. and W.S.W. and 17 miles wide, is of considerable height and detached from the islands which face the south-west coast of Korea. Its general outline † is that of an oval, with few deep indentations to affect its regularity. Its general appearance, as viewed from the sea, is inviting, there being a pleasing variety of hill and dale, and on the northern and eastern sides much cleared land, cultivation rising probably to the level of 2,000 feet. Above this all appears to be buried in thick forests of pines and other northern trees, even to the highest peak, mount Auckland, 6,558 feet above the level of the sea. Towards the northern and eastern parts some of the cones, 500 to 800 feet high, are so smooth and circular, that, with their little batteries or watch towers on the summit, they appear almost to be the work of art. This probably results from their method of cultivating the sides, as all the furrows appear to be made horizontally, which in process of time, by the constant falling down of the ridges, would effect such a regular outline.

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* This longitude depends on longitude of port Hamilton, 127° 18′ 30″ E.

† The description is by Captain Sir E. Belcher, H.M.S. *Samarang*, whose officers surveyed it in 1845.

North City.—The space on which the city stands is a broad valley, situated about the centre of the northern coast of the island, having a conspicuous flat eminence on its eastern side, and a small river or copious stream on the western; the country immediately surrounding it on all sides being barren. The city wall, on the sea face, occupies a line of about 500 yards, containing seven bastions, apparently with embrasures throughout, but no guns were noticed.

The manners of the population, excluding the superior class, are filthy in person and habit. Their fishing vessels are few, and of the most miserable construction. It is highly probable that Quelpart occupies the position of one of the penal settlements of Korea, and viewing it in this light, accounts for the gross manners complained of, and it will readily account for the variety in the races of beings which were found assembled, and for the low state of cultivation.

Cape Dundas.—The eastern extreme of Quelpart is a peninsula promontory, named cape Dundas; it is an extinct crater rising steeply on the north side and having a flat profile of some extent towards the south-east, at which end the descent is irregular. At 2 miles north of cape Dundas is Beaufort island. Between this island and the city on the north coast, the depths in-shore vary from 6 to 27 fathoms. A second city stands nearly opposite the former, on the south shore of the island, with a small bay on its west side, fronted by two small islands, named Hooper and Burnet, the latter being outside the former. West of Burnett is Richardson island, and east of it the islands of Mahon and Barrow; the latter a low, black, rocky islet, is surrounded by a reef. These four islands occupy a space of about 8 miles in an east and west direction parallel with the coast and not more than one or two miles distant from it. Towards the west end of Quelpart, on its south shore, there is a projecting promontory named Loney bluff, on the east side of which is a deep bay, with an island in it, Marryat island, surrounded by a reef, lying about 2 miles N.E. of the bluff.

Barlow and Giffard islands lie south of the bluff above mentioned, at the respective distances of one and 4 miles from it; they are both low and flat, and the former is surrounded by a reef.

Numerous reddish colored sand-hills rise up confusedly at the south end of Quelpart, the shores consisting of black volcanic rock broken by two conspicuous patches of white sandy beach, about 2 miles eastward of McDougall point.

Samarang rock lies W. b. N. about 2 miles from Barlow island, and S.W. about the same distance from Loney bluff.

Naboska rock, a sunken rock, on which the Russian ship *Naboska* was wrecked, is said to be about 500 feet long with deep water around, and to lie about 13 miles from the mainland of Quelpart, bearing nearly South from the west end of the island, in lat. 32° 59′ N., long. 126° 13′ E.*

A strong N.E. current sometimes sets past the south side of Quelpart; H.M.S. *Dove,* in a gale between S.E. and East, was set 30 miles in 24 hours in May 1861.

Supplies.—The productions of Quelpart are in very small variety. Rice, wheat, barley, sweet potatoe, large Russian radish, maize, and small garden produce, comprise all that was noticed, either in the grounds, under cultivation, or among the people. This does not appear the result of any deficiency in land fit for cultivation, but rather in the poor nature of the soil.

Water appears to abound on the southern side of Quelpart, but only on Hooper island could it be procured easily. It can be easily obtained on Barlow island, but there is not safe and convenient anchorage near it. Wood was purchased from the authorities, but in very small quantities; it is, however, abundant on the mountains, and on two of the off-lying islets it can be obtained by slight labour.

Anchorage. — Quelpart, throughout its extent, has but one safe anchorage, and that is at its east end off the southern bay of Beaufort island, which here forms a channel with Quelpart, about 2 miles wide, and through which the current sets strong to the southward. The second temporary roadstead is off the city on the northern shore of the island, but a vessel would be compelled to seek an offing at the first symptom of a N.W. breeze.

The third anchorage, at the western extreme of Quelpart, within Eden island, affords shelter from North (round east) to N.W., and offers an escape to leeward if requisite. A fourth temporary but dangerous anchorage, for a sailing vessel, is off Hooper island, near the city on the southern shore; but this is open from West to S.E., and is too confined to admit of beating out, should wind and sea come in suddenly.

SOUTH COAST of KOREA.—Off the south coast of Korea, between Maisonneuve island and Kuper harbour on the west, and Castle islands and Herschel island on the east, are about 100 conspicuous islands, from 300 to upwards of 2,000 feet in height, more than two-thirds of which are inhabited; and including the smaller islands, the whole number, more than 200, are contained in a space of between 1,500 and 2,000 square miles.

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* This reported position of Naboska rock was examined by H.M. surveying vessel *Sylvia* in 1877, with the result that no shoaler depth than 57 fathoms (mud) was obtained. Its position, as reported, has been repeatedly passed without any indications of its existence being seen, and it is probable, therefore, that Naboska rock does not exist in the position originally reported.

Speaking generally of this archipelago, it is bold, presenting very few hidden dangers. All these off-lying islands have been examined, but the mainland of the south coast of Korea is yet unsurveyed. In its south-east part the temperature in June averaged 75°, only a range of 3° between night and day; in July 80°. The climate is damp and humid, and although not excessively hot, very enervating. In spring and summer there are local variable breezes of small extent.

KUPER HARBOUR, is formed by Josling and Hunter islands on the south, and the Saw Tooth range on the north. The observatory spot on the north-east extreme of Josling, is in lat. 34° 17′ 20″ N., long. 126° 35′ 28″ E. To a stranger the Saw Tooth range, 1,323 to 1,643 feet high, will easily point out the harbour, as the range extends upwards of 2 miles, N. by E. and S. by W. with great irregularity. Entering the harbour from the eastward between Josling and Hunter island, steer for an anchorage in 5 fathoms, with the extremes of Hunter bearing E. by N. ¾ N. and S.S.E. ¼ E. out of the influence of the tides, which run strong about this cluster, attaining sometimes a velocity of 5 or 6 knots at springs.

CRICHTON GROUP, is the next cluster to the southward of Josling, from which it is separated by a channel 1½ miles wide, carrying 17 to 21 fathoms water. This group consists of four large conspicuous islands with numerous smaller ones attached.

Craig Nicoll, the northern of the four islands is 656 feet high, and presents from the eastward a flat ridge, with the southern part very irregular and falling in a precipitous cliff about 400 feet; it is unmistakable, nothing in the vicinity having the least resemblence to it.

Pa-oŏn, the eastern island is 5 miles long north and south, and almost divided into two parts by a narrow neck of land. The eastern extreme of the northern part rises to a summit 1,080 feet high, which extends to the westward in a regular ridge, elevated 919 feet. Harford peak, 1,148 feet high, the southern and highest part of this land, falls steep to the narrow neck, but extends in a regular ridge to the southward.

The central of the large islands is the lowest, its eastern and highest summit being only 520 feet high. On its south-east side are two bays, but at low water they dry out to their entrance points.

Montebello, the south-western island is separated from the central island by a channel, in some places not more than 2 cables broad. Its southern part is thickly wooded, which makes it a striking contrast to the islands around it. When viewed from the south-eastward its high summit 1,466 feet high, which is immediately over Race point (its south-west extreme), shows out very prominently; from this an almost level ridge extends E.N.E. 2 miles, and a little farther eastward is a nipple 956 feet high.

Harbour Entrance island, the southern of the Crichton group, is one mile long north and south, and a mile wide at its broadest or southern part. It is wooded, and its highest summit, 755 feet high, falls steep on the south side. The northern part of the island is 283 feet high and almost perpendicular.

CRICHTON HARBOUR, formed in the centre of the Crichton group, affords shelter from all winds. A vessel making for this harbour should if possible enter it from the southward between the eastern island of the group and Harbour Entrance island, both steep-to.

The northern entrance is between the north end of the eastern island and Green islet, 339 feet high, lying half a mile to the north-west; but there are two rocks awash at high water, one, the South Sister, lying close to the north end of the island, and the other, the North Sister, three-quarters of a mile to the northward. The channel, a quarter of a mile wide, is between Green islet and the South Sister. The islet may be approached on a westerly course to a cable, then bring it to bear N. by E. and steer to the southward mid-channel for an anchorage.* A good berth is in 10 or 12 fathoms, good holding ground, with Craig Nicoll just open westward of Green islet, bearing North, and Harford peak S.E. by E. Here the *Swallow* rode out a heavy south-east gale without starting her anchor.

Tides.—It is high water, full and change, in Crichton harbour at 9h. 50m.; springs rise 11½ feet; neaps rise 8¼ feet.

SELBY ISLAND, is 8 miles long S.E. and N.W., about 4 miles broad, and thickly wooded; with its two highest and central summits elevated 1,962 and 2,013 feet, the southern being the highest. At about half a mile south of the south-west point of the island, with the highest summit bearing North, is a rock which covers at high water. The island is separated from the west end of Mandarin island by a passage which appears free from danger; it has, however, not yet been examined.

MANDARIN ISLAND (Shun-he), lying eastward of Selby island, is 7 miles in extent, east and west, and 3 miles at its broadest part. The most striking feature is the high summit on its western end, which rises to 1,058 feet, and from seaward appears as an island, being only connected with the main part by a narrow neck of land.

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* H.M.S. *Sylvia* touched the ground apparently on the eastern edge of a bank situated between the east point of Montebello island, and the first small islet northward of that point, with Harford peak (1,148 feet high), bearing S.E. by E., and east point of Montebello S. ¾ W. There is probably only a depth of 6 feet in this position deepening rapidly to 3¾ fathoms at 25 yards eastward of it.—Navigating Lieutenant W. Pearce, R.N., 1875.

SERRATED ISLAND.—At 4 miles eastward of the Crichton group, between it and Montressor island, are three islands, lying in a N. by E. and S. by W. direction, of which the middle and largest, Serrated island, 756 feet high, receives its name from its very irregular summit.

Stanley island, the northern, is separated from the north end of Serrated by a passage half a mile wide, but it has not been sounded. At half a mile westward of the south point of Stanley is a rock which covers at high water.

Roberts island, the southern, is separated from the south end of Serrated by a passage 1½ miles wide, carrying 12 to 21 fathoms, mud. At a cable from the north point of the island is a rock which uncovers.

MONTRESSOR ISLAND, lying 6½ miles S.E. from the south-east point of Selby island, is about 13 miles in circumference, and bold-to all round. One of the highest hills near its centre rises to the height of 1,187 feet, and on its south-east side is a summit 1,236 feet high. Two low islets lie off its north-west side, where in fine weather good anchorage may be obtained in 8 or 9 fathoms, with a rock 15 feet high bearing South distant one-third of a mile.

Boat and Barrett islands, are two small islands, the latter being 387 feet in height: they lie 4 miles to the northward of Montressor island, and 1½ miles southward of Mandarin island.

MAISONNEUVE, situated S. by E. 11 miles from the Crichton group, is 314 feet high, and appears flat-topped from all views, with upright cliffs. There is deep water 28 and 30 fathoms on all sides.

MONTRAVEL, in lat. 33° 59′ N., long. 126° 55′ E., and 15 miles E. by N. from Maisonneuve, is 1,041 feet high, and covers an area of about a square mile. When seen from the westward it appears as a smooth round hill, with a long point or ridge projecting to the north-east. Its shores are bold, and on the north side is a bay and village containing about 300 inhabitants.

INSULT ISLAND (Kyo-ne), one mile northward of Mandarin island, has two summits, the easternmost of which, 1,108 feet high, is sharp and very conspicuous; and the westernmost, 1,275 feet high, generally appears as a long level range.

GOALEN ISLAND, 2½ miles south-east of Insult island, is one of the most conspicuous in this archipelago. It has two distinct summits, the higher and more northern 1,537 feet high, and slightly flat; the lower, 1,146 feet high, generally appearing as two nipples. Ridges gradually fall from the tops to the water's edge on the eastern side of the island, but on the western side is a steep descent, appearing almost inaccessible. Three detached low islets lie off the south-east side. No anchorage can be recommended immediately under the island.

FISHERMAN ROCK, lying W. ¼ S. 1½ miles from the summit of Bowker island, is very dangerous, as it covers at high water, and has 16 fathoms close to. The Koreans have placed a perch on it, which, though small, indicates its position.

BOWKER ISLAND, is separated from the north end of Douglas island by a channel 1½ cables wide, carrying 16 to 18 fathoms water.

The SOUTH and NORTH DOT GROUPS are a string of islets extending 4 miles in a N. by E. and S. by W. direction. The South Dot, averaging about 100 feet in height, extends 2 miles N. by E. from the southern islet, which is round, and bears N. ¾ E. nearly 4 miles from the summit of Goalen island. On the west side the water gradually shoals from 13 to 5 fathoms. At one cable North of the north end of the northern islet is a low water rock.

The North Dot, consisting of four islets, is separated from the South Dot by a passage three-quarters of a mile wide; the highest and central islet is 140 feet high.

DOUGLAS ISLAND, 6 miles long E.S.E. and W.N.W., and more than 2 miles in breadth, is separated from the north-east side of Goalen island by an excellent channel about half a mile wide, and carrying 8 to 10 fathoms over mud bottom. The north-east side of Goalen island is bold and may safely be approached; but on the south-west side of Douglas island is a muddy bay which dries out nearly a mile at low water, to the outer of the low rocky islets in it.

The sandy bays on the south-east side of Douglas island form one of its most conspicuous features, and cannot be mistaken for those of Auckland island (page 91), as its highest summit is only 794 feet high. Its south-west promontory falls steep to the westward from a height of 516 feet; its south-east point terminates in a hill 605 feet high.

SMALL GROUP is a cluster of six islands, fronting the south-east side of Douglas island.

COIN ISLAND, 5 miles south-west of Small group, is 214 feet high, and about one cable off its east side is a rock on which the sea breaks at low water; and a shelving rock lies off its south-east end. There is also at one-third of a mile W. by S. of the island, a flat rock 10 feet above high water.

WEBSTER ISLAND, situated 1½ miles South from Coin island, when viewed from east or west presents two distinct summits, the higher rising 435 feet above high water.

BIG and LITTLE BROTHER are two islands, 523 and 422 feet respectively in height, lying 1½ miles South of Webster island, and though bearing a resemblance to each other, are easily distinguished by the former being the larger. They are wooded, and present a darker appearance than the other islands in their vicinity. In passing southward of Big Brother it will be prudent to give it a berth of 2 miles, as detached rocks, 10 feet above high water, lie S. by W. one mile, and S.E. 1¼ miles, from its summit.

MOUSE ISLANDS are a small group, the highest being 210 feet, situated S.E. 3½ miles from the Brothers, and N.W. by W. ⅓ W. 18½ miles from Cone island. They have 18 and 20 fathoms close to, are inhabited by Koreans, and have on their east side a good boat harbour.

West, Middle, and East Dirt islands, situated respectively W. by S. ½ S. 12½ miles; W. by S. ½ S. 9½ miles; and W. by S. ¼ S. 6 miles from Haycock island; and 40, 30, and 10 feet above high water, can be passed close to, and have deep water between.

CLIFF ISLAND, about 300 feet high, situated N.E. ½ N. distant nearly a mile from Middle Dirt, has lying off its east side a flat rock 6 feet above high water.

KEPPEL ISLAND has a level, ridgy top; and its summit, about 700 feet high rises at 3 miles N.E. from the highest peak of Douglas island. Its north side terminates in a bold cliff. Between its south-east point and the east end of Douglas island are three islets, with 17 fathoms close to.

TRACY ISLAND, lying northward of Bowker and Keppel islands, is nearly 4 miles long, north and south, and nearly 2 broad. Its west side is marked by three distinct summits, the northern 624 feet high; the middle and highest of the island, 765 feet; and the southern very sharp, 646 feet. Its north and east sides are precipitous cliffs, and the depths are 19 and 20 fathoms close in shore.

AUCKLAND ISLAND, the south-eastern face of which has only been examined, rises to an elevation of 1,881 feet, and being covered with trees from base to summit, presents a striking contrast to the almost bare appearance of mountains of equal height on Hope promontory. Sandy bays show out very conspicuously on its south-west side.

PRETTY ISLANDS, two in number, lie off the south-west end of Auckland island, and are so named from their appearance, being well cultivated and partially wooded. There is a depth of 19 fathoms between them.

HOOPER ISLAND (Si San) is 3 miles long in a S.E. by S. direction, of an average breadth of a mile, and its summit, 571 feet high, from every view appears almost round. It lies 1¾ miles S.E. of Island point, the south-east extreme of Auckland, and the passage between its north end and the islets off Island point is one mile wide and carries 10 or 11 fathoms, mud bottom. On the east and west sides of the island the water shoals to 4 and 5 fathoms, mud.

TRIANGLE ISLAND, bearing W. by S. 3¼ miles from the summit of Hooper island, is 300 feet high, and from all views presents a very sharp summit.

SHAPE ISLAND, about 250 feet high, and with 11 fathoms close to, lies S.S.W. ¼ W. 4¼ miles from the south-east point of Hooper island.

Mitre rock situated W. ¾ N. 5 miles from the summit of Double Peak, and between it and the Peel group are several low islands, about 100 feet high, all having deep water close to.

HAYCOCK ISLAND, 4 miles to the north-west of Double Peak, is small, but rising to the height of 588 feet, presents from a southern view almost a perfect cone. It is bold all round.

SADDLE ISLAND, nearly 3 miles N. by W. ¾ W. from the centre of Double peak, is small, 223 feet high, and bold all round.

SON TSIK GROUP, consisting of three islands, is easily distinguished by its easternmost island having a sharp double peak 1,066 feet high. The western island, 788 feet high, is nearly a mile westward of the eastern, and fronting the north entrance of the passage between is Middle island; 7 fathoms may be carried through the channel between Double Peaked and Middle, but the western channel between Middle and the western island is narrow and has only a depth of 2 fathoms in it.

Anchorage.—There is good shelter from northerly winds, in 8 fathoms water at half a mile southward of Middle island; and excellent shelter from southerly winds (between S.E. and W.S.W.), in 6 fathoms, in the bay on the north side of the western island. There is a large village in this bay, and good water can be obtained.

Black Foot rocks lie E. ¼ S., 2½ miles from Double Peak island.

BROOK ISLANDS, lying 3 miles south-east of Double Peak, are a cluster of five, the southern 516 feet high and inaccessible; the central and largest inhabited. They are steep-to all round with passages between. There is a depth of 20 fathoms in the passage between the southern and central islands.

SURLY ISLAND, so called from its forbidding appearance and opposition by the natives to the officers of H.M.S. *Swallow* ascending the summit, lies N. by W. 12¼ miles of the Pinnacle group. The summit rises to the height of 714 feet, and about 400 feet from the top of its steep south side is a Korean village. The natives have built a landing place, but it is only available in the finest weather.

FARMER ISLAND, 635 feet high, lying N.N.E. ½ E. 7½ miles from the north point of Port Hamilton group, has off its north extreme a detached high water rock. The island is steep-to on all sides, covered with trees about 30 feet high, and easily recognized by its dark appearance.

NAN HOW GROUP.—PORT HAMILTON.*—This group lying about N.N.E. ½ E., 38 miles from the north-east end of Quelpart, consists of two large islands (Sodo and Sunhodo), deeply indented, their northern points nearly meeting, and which, with a third and smaller island (Observatory island), situated between their south-eastern points, form a spacious and well sheltered harbour, named port Hamilton, the main entrance to which is at the south-east part of the group.

Sodo, the larger island, is 650 feet high; Sunhodo is 783 feet high; and they may be readily distinguished from the numerous clusters of islets and rocks in the neighbourhood, by their greater size, and massive, bold appearance, as well as their peculiar position. Unless at a great distance from the south-eastward, they invariably appear as one island. Within Observatory island a vessel may be safely hove down for repair. There are five or six villages on these islands, with a total population in 1882 of 2,000 people. Every available spot of ground is under cultivation, the principal crop being millet.

Supplies.—During the visit of the squadron under Admiral Willes in 1882, there were no cattle on the islands, and supplies were scarce.

Tides.—It is high water, full and change, in port Hamilton at 8h.30m., springs rise 11 feet; but the rise is very irregular, the water standing at a higher level by 2 or 3 feet with southerly winds than with those from the northward. The tide sets pretty strong, over the bridge, in the narrows, but in the harbour it is slack.

Directions.—The Nan How group, so far as their examination went, is clear of danger on all sides, but is best approached from the south-east. On entering the port, the only danger that does not show is the Saracen rock, with 7 feet on it, lying at the entrance, 2 cables eastward of the east end of Observatory island. It is a small pinnacle, steep-to on the outside, but may be easily avoided by opening the Gap situated in the centre of Sodo island, a little northward of Observatory island, bearing W. by N., before bringing Triangle peak in line with Nose point, bearing S.S.W. Vessels may anchor anywhere within the port; the holding ground is so good as to render it difficult to trip the anchor after a few days.

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* *See* Admiralty plan :—Port Hamilton, No. 1,280, scale, m = 3 inches, with views.

When working in, it should not be forgotten that the north shore of the entrance nearly up to Shoal point is as steep as a wall, and that the Observatory island shore is quite safe, although rather shelving. The 3 fathoms edge of soundings from Shoal point extends more than half way across towards the west point of Observatory island, and there are only 2 fathoms water for nearly one-third of this distance.

The narrows or northern entrance may be used in fine weather by vessels of light draught. It is but 2 cables wide, and farther narrowed to 250 yards, by a small half-tide rock on the western side, and a reef off the eastern. A stony bridge here connects the islands, and the best water over it is nearly mid-channel, in 12 feet low water springs, rather away from the eastern side, which is the shoaler. With an off-shore wind a vessel under sail would be liable to be becalmed in the funnel-shaped entrance outside the narrows.

The Samarang rock, which always shows (there are two at low water), lies N.N.E. ½ E. 7 cables from the eastern point of the northern entrance; at 7 cables farther out in the same direction the water deepens to 44 fathoms.

There is no difficulty in entering the port at night if the weather be not very thick.

CONE and MOSQUITO ISLANDS.—Cone island, lying E.N.E. 3 miles from the south entrance of port Hamilton, is three-quarters of a mile in extent, of triangular shape, and on the centre of its north-east face is a remarkable cone about 610 feet in height. The island has low steep cliffs on all sides and is very bold of approach. Midway between it and the entrance of the port is a cluster of steep islets, about 300 feet high, called the Mosquitos, which are equally safe of approach.

PEEL GROUP consists of four conspicuous islands, lying in a N.E. by E. and S.W. by W. direction, each having off-lying islets. The central or largest island, Zeyts-por, is situated N.W. by W. 20½ miles from the highest of the Pinnacle group, and may be recognised by a peculiar long ridge rising to a summit, 1,075 feet high, which when viewed from north or south assumes the appearance of a sharp peak. The two south-west islands are respectively 1½ and 2½ miles westward of the south end of Zeyts-por, and are well cultivated, the former rising to a summit 489 feet high and the latter with a flat top 559 feet, falling with steep sides. The northern of the four islands is 440 feet high, and the passage between it and Zeyts-por is half a mile wide, and carries 16 fathoms water.

Anchorage in 5 to 8 fathoms, and sheltered from easterly winds between N.E. and S.W., may be obtained at a half mile from the west shore of Zeyts-por, with its highest summit bearing S.S.E.

HOPE PROMONTORY.—Dome island lies 7 miles W.S.W. of Harvey point, and the bays and indentations between, on the east side of Hope promontory, are studded with numerous small islands and high water rocks. No anchorages can be recommended, as the general depths are not more than 2 fathoms. A rock lies a third of a mile S. by E. from the south-east extreme of the little horse-shoe shaped island off the east side of Dome, but as the sea generally breaks on it, it is easily avoided. The southern part of Dome is 646 feet high; its western face is over-hanging.

From Dome island the west side of Hope promontory trends 7 miles in a N.W. by N. direction, and the passage between it and Auckland island, 2 miles to the westward, may be boldly run for in the event of a vessel being caught in an easterly gale. To do this, after giving Dome and the islets northward of it a berth of a mile, steer to pass half a mile off Brereton point, the west extreme of Hope promontory, when Gull islet, 10 feet high (the northern of a small cluster of islets) will easily be made out. Gull may be passed close to on its south side, as there are 7 fathoms within half a cable of it, when steer W. by N. about 1½ miles, or until Dome island summit is in line with the north-east end of Auckland island; the vessel will then be in a good sheltered anchorage in 14 fathoms.

HERSCHEL ISLAND.—At 23 miles N. by W. of the highest of the Pinnacle group, is Gage point, the south extreme of Herschel island, and immediately over it rises a wooded even range which extends 1½ miles to the northward of Herschel summit, 1,380 feet high. At 1½ miles N. by W. ¾ W. of Gage point is Cooper promontory, and between is a bay about three-quarters of a mile deep, in which a vessel may anchor in 4 fathoms low waters springs, close under the point; with the south extreme of Bald rock touching the point; this, however, is an unsafe anchorage with the wind south of S.S.E., or west of N.N.W.

From Cooper promontory the west coast of Herschel island trends N.N.W. 4 miles to Harvey point, and is fronted at the distance of about half a mile by three islands, of which the largest and northernmost is Taylor island, 767 feet high. Between this island and the coast is Herschel cove, the entrance to which, a quarter of a mile wide, is between Taylor and the next island south of it.

Anchorage. — The cove affords nearly landlocked anchorage in 4 fathoms at low water, with the summit of Hooper island in line with the entrance, and the north-east extreme of Taylor island touching Harvey point.

Bald rock is 9 miles N.E. ½ N. from the centre of Double Peak. Between it and Herschel island there are 8 to 15 fathoms water.

WALKER ISLAND, lying 6¾ miles N.E. by E. ½ E. of Cone island (Nan How group) is a rugged rock, 325 feet high, elongated a little in an east and west direction.

Powell rock, lying 2½ miles farther in the same direction, are two pinnacle rocks close together, and about 20 feet above high water, with reefs projecting one cable off their southern sides.

PINNACLE and CASTLE ISLANDS, form each two groups of three islands lying in a N.W. by N. and S.E. by S. direction, and are unmistakable, their name from all points of view being an exact description. The Castle, lying East 14 miles from the entrance to port Hamilton, is the south-easternmost group on this part of the coast. The high land of the Korea is well in sight from them in clear weather, but there are no islands to be seen to the eastward of a North bearing. From a distance they appear as three steep blocks, 300 feet high, in a north and south direction ; there is an islet to the east of them, and one off their south point.

To the north-west of the Castle group, and separated from it by a channel a mile wide carrying 44 fathoms water, is the pinnacle group consisting of two islands, and an islet 60 feet high and perpendicular on all sides lying a mile to the eastward, but, as their name implies, they are of a different form. The southern of the two islands has a sharp conical peak, 333 feet high; its west face is very perpendicular, and from its south end extend detached, high water rocks, half a mile to the south-east.

Anchorage. — One of the best anchorages in this Archipelago is in Long reach formed between Insult and Mandarin islands. Vessels steering for it should pass eastward of Perforated island, 200 feet high (lying half a mile off the east end of Mandarin island), rounding it close as there is deep water. Precaution should be taken not to shut the summit of Goalen island in with the north-east point of Mandarin, as a mud bank extends more than 2 cables off the Mandarin island shore. If the weather be thick and Goalen island is obscured, the north-east point of Mandarin island touching Perforated island, and the highest summit of Insult island bearing N.E. by N., is the best anchorage.

Supplies.—Water can be obtained at most of the inhabited islands. The natives were not allowed to barter, and had to obtain the permission of the most influential mandarin to make a present. In this manner a few bullocks, pigs, and fowls were obtained by H.M.S. *Swallow*. Few fish were caught, although the seine was frequently hauled.

Tides.—Amongst the islands off the south coast of Korea the time of high water, full and change, appears to be earlier at port Hamilton than at Kuper harbour, with an increasing regularity from east to west. At port Hamilton it is at 8h. 30m., Hooper island at 9h. 10m., Tracey island at 8h. 58m., Kuper harbour at 9h. 28m., and at Crichton harbour at 9h. 50m.; and springs rise 11½ feet, neaps 8¼ feet. The flood stream sets to the westward, the ebb to the eastward, turning 2 hours after high and low water by the shore.

The time of high water in Crichton harbour was found to be very irregular, southerly winds causing an early flood, and a very late ebb. Between port Hamilton and Hope promontory the rate of the streams seldom exceeds 2 knots, but to the westward about the Crichton group, they sometimes run 6 knots, with dangerous overfalls among the islands.

The COAST.—From the eastward the south point of Herschel island forms a bold headland, on the east side of which, just off a long point, lies an island, 177 feet high, having two dangerous rocks 12 feet and 6 feet high, lying respectively N. 66° E. one mile, and S. 73° E. 2 miles from it; this locality not having been examined, other dangers may exist.

From the above long point the coast of Herschel island trends north-west 2½ miles, to a bay 2 to 3 miles deep in a westerly direction, and one mile wide at its entrance, thence N.N.W. to a bight 2 miles across, at the head of which there is an isolated conical hill; between this bay and bight the hills are low, and the shore is fronted by two small islands.

Immediately north of this bight, a channel containing numerous islets runs in a westerly direction about 6 miles. Sharp peak, which appears to be part of the mainland, is conical, 1,540 feet high, and separates the channel from a large sound lying to the northward. The western shore of this sound trends north-west 18 to 20 miles, when it connects with the mainland at the head of Willes gulf. The east side is formed by a chain of large islands lying in a north and south direction. The south entrance to the sound is partly hidden by Wolseley island, about 2 miles long east and west, having at its east end a conical peak 940 feet high, sloping gradually to its west extreme, which is low. Numerous small islets lie off the south shore of this island. At 3½ miles eastward of Wolseley island there is a bold, rugged, square peak 980 feet high; in this vicinity is the Korean naval station Sun-chhön-pho or Shun-ten-po, with numerous islands extending to the southward.

SEEN ISLANDS, situated about 13 miles east of Herschel island, consist of three large and twelve small islands lying in a north and south direction.

North Seen island is a thickly wooded, and deeply indented island, having on its south side a peak 1,105 feet high; the west side consists of cliffy points with bays between, the southernmost of which, named Tozer cove, is sheltered from easterly winds, but it has not been examined. The east side of the island is nearly straight, having near the south end a narrow inlet, named Frederick cove, which affords good anchorage for small vessels, in 3 to 9 fathoms, mud. The entrance to this cove may be recognized by a small, round islet, 183 feet high, lying close to the shore. At one mile East from the entrance to Frederick cove lie two small islets, between which and the north-east point of North Seen island, there are some islets and rocks with irregular depths between them.

Tides.—It is high water, full and change, in Frederick cove, at 7h. 50m.; springs rise 7 feet (approximate).

Middle Seen island has bold sides, undulating hills, and is nearly in two parts, the western portion being only joined by a narrow isthmus. South of the isthmus there is a well protected bay, but the bottom is smooth rock, and affords no holding ground. North of the isthmus there is a boat harbour, and a large village. A steep island 300 feet high, and a small islet lie off the west side, and a rock having two heads 10 feet high, lies 1½ miles west of the south-west point of Middle Seen island. The passage between Middle and North Seen islands is shallow, and should not be used.

South Seen island has a conspicuous, pyramidal summit, 715 feet high. Off the north-west shore of the island there is a white, triple-topped islet 196 feet high, having, at half a mile N.E. of it, a rock 8 feet high. The south and south-west shores are bold and cliffy, and the south extreme terminates in a low point, off which the water is apparently deep. On the south-west shore there is a deep bay which extends nearly across the island.

There is a deep channel between South and Middle Seen islands, apparently clear of hidden dangers. Several ledges extend from the north shore of South Seen island, and mid-channel should be kept when passing through.

The bay formed by Herschel and Seen islands has depths of 4 to 5 fathoms on the west side, deepening to 8 and 10 fathoms to the eastward. Near the centre of this bay there are two conspicuous white rocks, 126 feet high.

Bedwell island, 360 feet high, situated 5 miles E. ¾ S. from South Seen island, is a small, steep island with a flat top.

Encounter rock, in lat. 34° 18′ N., long. 127° 52′ E., is about 60 feet high and 50 yards in extent.

SPINDLE ISLET, lying W. $\frac{1}{4}$ N., 18 miles from the Sea rock, shows two peculiar sharp rocks on its summit (200 feet high) when seen from the S.S.W. From the E.S.E. these rocks are in a line. On the west side of Spindle islet there is a village.

A rock 200 feet high lies close to the south shore.

SKEEN ISLAND, 400 feet high, situated W. by N. $\frac{3}{4}$ N. 13$\frac{3}{4}$ miles from Sea rock, shows from the south-east four summits, the south appearing nearly detached, and at a distance quite so. It appears bold-to, and may be passed on the west side at half a mile.

OBSERVATORY ISLAND (Yokuchi-to), 3 miles north-eastward of Skeen island, is 3$\frac{1}{2}$ miles in extent, and covered with thick brushwood. It has five arms, on the east, west, and south, formed by ridges from its peak (1,272 feet in height), which has a high shoulder to the north; there are deep bays between the arms.

On the north-east side of the island, between two spurs, there is a good harbour named East harbour, well protected from all directions except between N.N.E. and E.N.E.; no swell, however, can set in from that direction. A short vessel, after entering in mid-channel, will obtain good anchorage in 9 fathoms, mud, in the western arm, but a large vessel must anchor in 11 fathoms in the wide part of the harbour.

The south-east point of Observatory island is rugged, with two large islands near it. Between the point and the western of these islands the depth shoals suddenly to 4$\frac{1}{2}$ fathoms. Between the south-east point and Broken islands, at about 5 miles south-east of it, there are two rocks; the southern and higher is 35 feet high.

The south point is conspicuous, being bold and attached to the island by a low neck. There are three rocks between this point and the south-east point, the rock nearest the south point being only 2 feet above high water. The west coast has two open bays, neither of which form desirable anchorages, but the bay south of the middle spur was used by H.M.S. *Dove* in 1861, when a depth of 15 fathoms was obtained at 2 cables, and 20 fathoms at 5 cables from the head of the bay.

The north coast is regular and steep-to, with a clear channel about 2 or 3 cables off shore, between it and New group.

New group consists of ten islands, from a quarter to 1$\frac{1}{2}$ miles long, as well as several rocks of various heights. The largest island has a blunt peak, 628 feet high, bearing N. $\frac{1}{2}$ E. 2$\frac{1}{2}$ miles from the summit of Observatory island, with a lower but sharper peak to the westward.

The westernmost of the group is a round islet with a blunt conical peak. The north-easternmost islet is long, flat, and partially cultivated. This islet should not be approached within half a mile, as discoloured water was seen around it.

OPPOSITE ISLAND (Tobi-to), 3 miles north-west of Observatory island, is 1¾ miles long, wooded and very bold. Its peak is 1,544 feet high, from which it slopes very steeply to the water's edge. Opposite island affords no shelter. A depth of 18 fathoms will be obtained at half a mile northward of this island.

Dove group, situated 2½ miles E. by N. from Observatory island, consist of two bare, narrow islands, three quarters of a mile and 1¾ miles long respectively, with several islets and rocks of various sizes. The largest island has a blunt summit 650 feet high near its west end, and its sides are steep to the water. The east point of this island has on it a rounded hill, and the south-east point is remarkably jagged. A dangerous rock, covered at half tide, lies S.S.E. ¾ E. nearly a mile from this point.

A rocky patch, covered at half tide, lies between the two largest islands.

Between Dove and New groups there are two double islands. The eastern island, distant 1¼ miles from Dove group, consists of two rocky islets joined by a sand spit that occasionally covers. A reef extends one cable S.S.E. from the southern islet. The northern islet has a jagged summit 176 feet high.

The western island, at half a mile W. by N. from the eastern, consists of two dark islands 313 feet high, covered with brushwood and joined at half tide by a rocky ledge.

INCOG ISLANDS, situated 3½ miles N.E. by N. from Dove group, consist of two islands, the northern and higher 448 feet high, is a third of a mile long, pointed, and has cliffy sides.

The southern is also cliffy, with a flat summit. A rock 10 feet high lies 2 cables S.E. by E., and another rock, 6 feet high, lies 2 cables N.E. by N. from this island.

SPLIT GROUP, situated 9 miles N.E. by N. from Sea rock, consists of four islands lying in a N.E. by N. and S.W. by S. direction. The largest island has a peaked summit 780 feet high, with a lower peak north-east of it. The eastern shore of this island is cliffy, but the western slopes to the water's edge and is cultivated. The southernmost island of the group is very jagged.

There are depths of 30 to 40 fathoms between the northernmost island of this group and Fairway island.

BROKEN ISLANDS, are a small group of islands and rocks, a mile in extent in a north and south direction. The southern or highest island, elevated 330 feet, is 6¾ miles N.W. by W. of Sea rock; there is a hollow in its summit. At 6 cables south of Broken islands there is a depth of 21 fathoms.

FALSE SENTINEL (Kaku-to), a high, brown, rugged island, of which the northern part is 730 feet high, lies 3 miles N.N.W. of Sea rock, and 13 miles westward of Sentinel island; for which it might be taken when viewed from a distance from the south-west. A depth of 34 fathoms will be obtained at 6 cables south of this island.

SEA ROCK, a small bold rock, flat topped, and 50 feet high, lying S.E. by S. 3 miles from False Sentinel, may be passed at three cables south in 34 fathoms water.

Two rocks.—N.E. ½ N. of Sea rock, at 4½ and 5½ miles distance, are two high rocks; the south-western is nine-pin shaped, the other a broader islet. There is discoloured water between these rocks and Outer Junk islet.

INNER AND OUTER JUNK ISLETS.—West and S.E. 1¾ miles respectively of the peak of the largest Split island are two groups of rocks, some of which appear like small junks.

SKETCH ISLAND (Siochi-to), North 8 miles from Sea rock is a small, high island, nearly quoin shaped, 432 feet high, the steep part being to the west; this island lies about 4 miles to the southward of a peak 1,035 feet in height (Flat Peak).

SENTINEL ISLAND, 340 feet high, the outermost island of the group forming the eastern part of the Korean archipelago, lies N.W. by W. ½ W. 28 miles from the entrance of Tsu sima sound, and 12 miles from the nearest part of the Korea. It is isolated, bold, and somewhat rugged, with a spur on its north slope, and shows a double summit steeply sloping to the sea. Its north point is cut through by a remarkable ravine. It is only 600 yards in extent and rises to the height of about 400 feet. This island may be passed on either side at a distance of half a mile.

Atalante islands, lying N. by E. ½ E., 8 miles from Sentinel island, are about three-quarters of a mile apart, north and south from each other. The northern island is 30 feet high and 200 yards long, having at about a quarter of a mile west of it, a rock which dries 6 feet at low water. The southern islet consists of two boulders, 60 feet high, and separated at high water.

Belam channel, lying between the north extreme of Seen islands and the islands near Sun-Chhön-pho, is deep, clear, and straight. The easternmost island on the north side of the channel is low, with its summit near the south-west extreme; on the south side of the channel there is a small bare rock, 30 feet high. Keep in mid-channel, and when half way through, steer a little to the northward to avoid a point with tide whirls off it, projecting from North Seen island. At 2½ miles W. by N. from the north-west point of this island there is a flat rock, 95 feet high, which may be passed on either side.

WILLES GULF.—Balfour head, on the south shore of San-öm-me-san island, is bold with a gap or saddle near its extremity, and is the south entrance point of Willes gulf, the west side of which is formed by the chain of large islands mentioned in page 97. Good anchorage in 4¾ fathoms, mud, can be obtained behind a small island in the bight north-west of Balfour head; this island may be rounded on either side, taking care to avoid a rock which covers and uncovers at 1½ cables S.E. by E. ½ E. from the south end of the island.

From this bight the coast trends northward with several conical hills at the back. There are depths of 7 fathoms at a distance of one mile from the shore.

At 7½ miles North from Balfour head there is a small white rock, 4 feet high, named Target rock, lying half a mile from the shore. Abreast this rock the coast trends in a north-westerly direction into a bight which appears to connect with the large sound to the westward, thence from the bight it again trends in a northerly direction 7½ miles to Perry point, with two or three rocky islets close to the shore. Immediately north of this bight there is a small island, off the ends of which the water is apparently shoal.

At Perry point the coast trends abruptly to the W.S.W. into the large sound. The north shore of Willes gulf, formed by the mainland, lies in an East and West direction, and is about 10 miles long. Midway between Perry point and the mainland to the north-west, lies an island, by which the entrance to the sound is partially hidden. At 2 miles N. ½ W. from Perry point there is a low island, with a reef extending several cables from it, in an E.S.E. direction.

A river, locally known as the Sa-poo, flows into the head of Willes gulf, filling the vicinity with mud banks, which are covered with fishing stakes.

Willes mountain, 2,990 feet high, situated near the north-east part of the gulf, overlooks a narrow but deep channel leading into Purvis inlet. In this part there are numerous islets and rocks; some of the latter cover and are marked by bamboo stakes; the depths are very irregular. Anchorage may be obtained on either side of Willes gulf; bottom, soft mud.

NAM-HAI-DO, the largest island off this coast, forms the eastern shore of Willes gulf; it is 15 miles long, 13 miles broad, and has on it several ranges of hills. The west side of the island is high, with cultivated slopes and numerous villages; the southern portion of this side is indented and has several islets within 3 cables of the shore; near the south-west point there is a remarkable horn-shaped peak, 1,160 feet high.

A dangerous rocky shoal, that covers at high water, named Douglas patch, lies N.N.W. ¾ W. 3¼ miles from Horn peak, and N. by E. ¼ E. 4¾ miles from Target rock. To clear this shoal, the west point of Nam-hai-do should not bear northward of N. ¼ E.

The south coast of Nam-hai-do lies in an E. by S. and W. by N. direction, and at 2½ miles from Willes gulf it opens into Carpenter bay, 4 miles deep, and 2 miles wide, having on the east side of the entrance a high, round island. There are several low islands and rocks towards the head of the bay. The general depth is 8 fathoms, mud. Anchorage may be obtained, during westerly winds, off the first village on the west side of the bay.

A pointed islet, 309 feet high, with steep sides, lies 2 miles off the entrance to Carpenter bay.

The south-east point of Nam-hai-do has off it a group of ten islands, some of which are connected by reefs. There are apparently no dangers outside this group, which may be rounded at a distance of one mile, in 20 fathoms water. A flat, rocky islet, 93 feet high, lies S.W. ½ W. westerly 4½ miles from the south-easternmost island of the group.

Mi-jo-muk is an open, capacious bay on the eastern shore of Nam-hai-do, 2½ miles from the south-easternmost island of the group. An islet, named Woody islet, the west shore of which is in lat. 34° 43′ 18″ N., long. 128° 3′ 47″ E., occupies the centre of the bay, and may be passed on either side. Good anchorage will be obtained in 8 fathoms, mud, with the north end of this islet bearing E. by S. distant 3 cables. Good oysters will be found on the east shore of the islet.

There is a walled town and a boat harbour opposite the islet; the natives were very friendly during the visit of H.M.S. *Magpie.*

At 2 miles N.N.E. of Woody islet are two more islets, the northern of which is 250 feet high, with a dome shaped summit.

The shore from Mi-jo-muk trends north-easterly 6 miles to the north-east point of Nam-hai-do, thence N.W. by W., and is said to trend in that direction to the north-west point of the island, which forms the channel into Purvis inlet, under Willes mountain.

Tides.—It is high water, full and change, in Mi-jo-muk bay at 8h. 0m.; springs rise 8 to 9 feet (approximate).

PURVIS INLET.—About a mile northward of Nam-hai-do there are two smaller islands (the channel between which dries at low water), named Chöng-nyang-do and Chhang-sön-do. These islands lie east and west from each other, and form the west side of the mouth of Purvis inlet. Chong-nyang-do, the eastern island, is of moderate elevation, with bare, undulating hills; its eastern shore is much indented and rocky.

The east side of the entrance to Purvis inlet is formed by Sin-su-do island, 315 feet high, and by several rocky islets lying on a reef north-west of this island.

Between the north point of Chhang-sön-do and the islands northward of it are the narrows, deep, clear, and one cable wide at the narrowest part. The tide runs at the rate of about 5 knots in this part of the narrows.

Tides.—It is high water, full and change, in Purvis inlet, north-west of the narrows, about 9h. 0m.; springs rise 9 feet (approximate).

Directions.—Proceeding from the eastward for the narrows, pass 2 cables off the south end of Sin-su-do, when the narrows will appear open bearing N.W. ¾ N. Chöng-nyang-do should be given a wide berth to avoid a ledge, which covers occasionally, and extends one cable from it, abreast Sin-su-do. Keep the narrows open, but do not close the rocky islets on the north side nearer than 2 cables. This will lead in the deepest water (11 fathoms). On reaching the narrows steer through in mid-channel, keeping tolerably near the Chhang-sön-do coast, until all the islands are passed; this leads into a sound about 8 miles long north-east and south-west, and 5 miles wide. After entering this sound depths of 12 and 13 fathoms will be obtained, shoaling to the northward to 3 fathoms, mud and shells.

The COAST.—On the mainland north of Sin-su-do island is the village of Sam-chhöl-li, protected by the reefs lying north-west of the island. From this village the coast trends south-easterly 3½ miles to a point, from which it recedes into a bay with numerous indentations, thence it trends eastward to another point, near which there is a comparatively high island, with two rounded summits of equal height, lying one-third of a mile from the shore. A rock, awash at high water, lies half a mile E.S.E. from the south end of this island; and at about 4 miles to the eastward there is a group of five or six islands, with an extensive bay to the northward.

At one mile north-east of the easternmost of these islands lies the entrance to Kio-son-hai basin, 9 miles in circumference, with depths of 4 to 6 fathoms, mud. From Kio-son-hai the coast trends S.S.E. 10 miles to Cho-do island, near the entrance to Shadwell gulf, and is indented by deep bays. Numerous islands and rocks front this part of the coast, but at a distance of 1½ miles from it, even depths of 8 to 10 fathoms will be obtained.

SHADWELL GULF which separates the large island of Cargodo (*see* page 106) from the mainland, extends to the northward from the east end of Cho-do and is connected to Sylvia basin by a narrow strait.

SA-RYANG-DO and CHHU-HO-TONG, situated 8½ miles North from Observatory island, are the most important of the inner islands between Purvis inlet and the south extreme of Cargodo island. Sa-ryang-do and Chhu-ho-tong occupy a space 5 miles long north-west and south-east, and are separated from each other by a strait 3 to 6 cables wide, which small vessels may use by keeping in mid-channel; about half way through, a ridge extends across it with only 14 feet water over it. Anchorage in 7 fathoms, mud, may be obtained at half a mile within the western entrance of this strait.

A small rock, 6 feet high, with a white top, lies 1½ miles S.S.E. from the south-east extreme of Chhu-ho-tong; and a group, consisting of four rocky islets, lies nearly 2 miles southward of this island.

Su-u-do, a bold island 635 feet high, situated 2½ miles W. by N. from the western entrance of the above strait, is one mile long east and west; about 2 cables from its northern shore there is a rock one foot high.

Ord island, 628 feet high, and about one mile in diameter, lies 6 miles N.N.E. from Observation island. When seen from the eastward Ord island appears flat topped, but from the southward pointed.

CHO-DO consists of six islets, four of which are joined by short ledges, and two are separated by narrow channels; these islets form a bay open to the northward. At the head of this bay there is a village, with a camber for junks, situated under the highest summit 365 feet high.

There are three islands south of Cho-do; the middle and highest, 717 feet high, lies about a quarter of a mile from the south extreme of Cho-do; these islands also form a bay open to the northward, having in it a rocky patch, and under the highest peak there is a village.

Caution.—Care is necessary when coming from the westward not to mistake this bay for that on the north side of Cho-do.

Anchorage.—The depths in the bay north of Cho-do are uneven, but well protected anchorage in 9 to 7 fathoms may be obtained on a mud bank, with the village bearing W. by S. ¾ S. and the central summit, S. by W.

Yong-chho-do, situated E. ¾ S. 2¼ miles from Cho-do, is nearly 2½ miles long east and west, and three-quarters of a mile across its broadest part. The east end is formed by a bold hill 660 feet high, connected with the other part of the island by a flat isthmus.

Passage rock, 15 feet high, lies three-quarters of a mile N.W. by N. from the west extreme of Yong-chho-do.

Bibi-to, situated a quarter of a mile south of Yong-chho-do, is a double island lying in a north and south direction and joined in the centre by a sand beach. The southern summit is 1,035 feet high, and the northern 666 feet high. A rock, 6 feet above water, lies E.S.E. nearly a mile from the southern part of this island.

Cheuk-do, 462 feet high, at a quarter of a mile east of Yong-chho-do is bare and smooth topped. A rocky shoal of 14 feet water, lies 1½ cables north of the east extreme of this island.

CARGODO ISLAND (Ko-je-do) is 20 miles long north and south, 13 miles broad, and mountainous. The coasts are deeply indented; the north-east and east coasts are high and bold; the south coast from Shadwell gulf to cape Corbett, the south-east point of the island, is bold, bare, and fronted by numerous islands.

Pong-am-do, at about 2 miles east of Shadwell gulf, extends nearly across the entrance of Cargodo gulf, and forms the north side of the channel, of which Yong-chho-do and Cheuk-do form the south side. Pong-am-do lies in an east and west direction, high at both ends and low in the centre.

Cargodo gulf extends about 6 or 7 miles in a northerly direction from Pong-am-do, but it has not been thoroughly explored. The passage leading into the gulf east of this island is the better and deeper, the western having only a depth of 3 fathoms, and tide whirls occur.

Chégumi harbour lies about half a mile east of Cargodo gulf, and affords good anchorage in 6 to 4 fathoms. The north side of the harbour is steep and bold; the south entrance point is low and projects from a white sand beach. Near this point there is a rock above water. On approaching this harbour the depths shoal suddenly from 17 to 9 fathoms, thence gradually to 3 fathoms at the head of the harbour.

Tai-dok and So-dok islands.—Tai-dok island, 343 feet high, lies about 1¼ miles south-west of Chégumi harbour. Nearly one mile south-west of Tai-dok lies So-dok island, 306 feet high, and in the channel between them is a small island 245 feet high.

The COAST from the south entrance point of Chégumi harbour trends S.W. by S. 1¼ miles to the south point of Cargodo island, leaving a channel 3 cables wide between it and Tai-dok island, thence E. ½ N. 3½ miles to cape Corbett.

Fairway island, 520 feet high, situated 1¼ miles S.S.E. from Tai-dok island, is half a mile long north-west and south-east, and is cultivated on its south-west side.

The Dumps, lying three-quarters of a mile north-east of Fairway island, and within 3 to 4 cables of the south coast of Cargodo island, consist of several rocky islets, the highest of which is 236 feet high.

Ninepin rocks, situated 1½ miles east of Fairway island, consist of six large pinnacles and two or three small rocky heads. A reef appears to extend 2 cables east of these rocks.

There is a channel with a depth of 35 fathoms between the Dumps and Ninepin rocks; the tide sets through this channel at the rate of about 3 knots at springs.

Directions.—Vessels from the eastward bound to Purvis inlet, or Willes gulf through the inner channels, should, from abreast cape Corbett, steer between the Dumps and Ninepin rocks, with the south extreme of Sketch island seen open of the south extreme of Fairway island, bearing W.S.W. until Ninepin rocks have been passed; thence north of Fairway island, through the channel between Tai-dok and the south point of Cargodo island, when a N.W. by N. course should be steered, passing in mid-channel north of Cheuk-do, Yong-chho-do, and Cho-do islands. The depths in this channel vary from 9 to 30 fathoms.

If proceeding to Purvis inlet, when 2 miles west of Cho-do steer N.N.W. ¾ W., keeping 1½ miles off shore until the north extreme of Sa-ryang-do bears West; when a course should be steered to pass it at a distance of three-quarters of a mile. From Sa-ryang-do a W. by N. course will lead to the entrance of Purvis inlet.

If proceeding to Willes gulf pass south of Ord island and north of Opposite island, thence, after rounding the group of islands south of Mi-jo-muk, steer W. by N. ½ N. for the entrance of the gulf, keeping a little over a mile from the shore.

There is a straight and apparently clear passage to the westward, south of Fairway island, on a W. ½ N. course for 10½ miles, passing between Dove and Incog islands; thence a course may be steered to pass north of Opposite island for Willes gulf, or east of Ord island for Purvis inlet.

CAPE CORBETT, which forms the south entrance point of Ko-ta-thai harbour, is a bold point having a blunt conical hill over it and three small islets extending about a quarter of a mile from the shore in an easterly direction.

KO-TA-THAI HARBOUR is 1½ miles wide at the entrance, and about one mile deep, having at its head a small junk harbour 2 cables wide at the entrance. The holding ground in the outer harbour is good, the depths shoaling rapidly from 13 to 6 fathoms, mud. This harbour is open from E. by S. to S.E. by S., and a swell from north-east will set into the anchorage.

Dome peak, 1,927 feet high, situated about 1½ miles north of Ko-ta-thai harbour, is the highest peak on this coast.

Finger point, at half a mile east of the north entrance point of Ko-ta-thai harbour, is a bold detached cliff, 422 feet high, at the extremity of a low point. Between Finger point and Broughton head, 1,035 feet high, at 4 miles north-east of it, the coast recedes and forms an open bay, 2½ miles deep.

Tide rips.—There are strong tide rips between cape Corbett and Broughton head, and the tide whirls in the open bays stir up the mud, forming discoloured patches of water.

Bushy island, 300 feet high, situated in the entrance of the above bay at 1½ miles S.W. ½ W. from Broughton head, is rugged, with dark cliffs, but cultivated and bushy on the top. There are several jagged rocks extending from the south-east extreme of this island.

Dromedary island, situated half a mile north of Bushy island, has a high and a low summit. The north end of the island appears to be connected with the adjoining coast by a ridge. There is deep water between Bushy and Dromedary islands, but the better channel into the bay is south of Bushy island.

Broughton harbour, at half a mile N. by W. from Dromedary island, is well protected, and has general depths of 6 to 9 fathoms, mud. The west entrance point is formed by a projecting conical hill 470 feet high, connected to the shore by an isthmus, on which there is a large village. Two rocky heads that cover at high water lie one cable from the south-east side of this point.

Inner harbour, which is separated from Broughton harbour by the projecting conical hill and isthmus above mentioned, has near the centre an islet 166 feet high, with a dry ledge extending half a cable east of it. The best anchorage is in 7 fathoms, mud and shells, on the east side of the harbour, with Finger point just shut in with the base of the projecting conical hill.

CENTRE HARBOUR.—From Broughton head the coast trends N.W. ¼ W. 3 miles to Centre harbour, with Broughton island, 340 feet high, lying midway between at one mile from the shore. Centre harbour is a well protected and useful harbour of refuge, with apparently a deep and clear approach. A small ledge projects half a cable from the inner side of the south entrance point; and a rock, awash at high water, lies one cable from the south-west shore of the harbour.

Anchorage may be obtained in 8 to 5 fathoms, mud, on either side of the harbour. The principal village, named San-guen, lies on the south side just within the entrance. Centre peak, 1,840 feet high, lies about three-quarters of a mile north-west of the harbour.

Junk sail point, situated 3½ miles N.N.E. from Centre harbour, is a comparatively low narrow point terminating in a pinnacle rock. Westward of this point there is a deep bay extending in a south-westerly direction to the foot of Centre peak, but it has not been examined. About 1¾ miles north-west of Junk sail point there is a rock, 15 feet high lying 2 cables from the shore, having at 2½ cables S.S.W. from it, a rock which covers at half tide.

Red island, 258 feet high, situated 4½ miles N. by W. from Junk sail point, and about half a mile from the shore, is half a mile long east and west, and flat topped. At 4 miles E.N.E. from Red island there are four rocks, named Red rocks, 30 to 90 feet high, with foul ground between ; these rocks should not be approached nearer than 2 cables.

The COAST.—Abreast Red island the coast recedes, forming a bay 2 miles wide in a north and south direction, having near its centre an islet 30 feet high ; this bay has not, however, been examined. From its north entrance point the coast trends about N.N.E. 1¼ miles to the north-east point of Cargodo island.

Winds and weather.—When the north-east monsoon is blowing on the east coast of Korea and in the Korean strait, it will be experienced on the east and south-east coasts of Cargodo island, but does not extend westward of Split islands. Within the outer islands as far west as Opposite island and into Purvis inlet, light and variable winds from N.W. to N.E. will be experienced.

On the south coast of Nam-hai-do a steady north-westerly wind is first experienced, increasing to the westward until between Herschel and Seen islands, when fresh winds from N.W. to W.S.W. may be experienced. The wind usually freshens at night and falls light towards the morning.

During summer the winds are light and variable, interrupted occasionally in the months of August and September by a typhoon, but they do not reach the heads of the inlets with much force. September, October, and November were during the *Magpie's* visit very dry, with clear sky and no fog.

Tidal streams.—There is very little set along the coast between Herschel island and the south point of Cargodo island. The flood tide appears to set to the westward, and the ebb to the eastward at the rate of about half a knot an hour at springs ; in some of the narrow channels the streams run from 3 to 4 knots.

YÖN-DAI-SAN (Borlase Island), situated at the entrance to Ashby and Douglas inlets, is easily recognised from seaward. The island is in the form of an isosceles triangle, having its apex at Brine point, its south extreme, and is about 5 miles in length and 3 miles broad at its northern end; an irregular chain of hills lies in a north and south direction, the central peak of which (mount Borlase) is 1,492 feet high, and very conspicuous, showing a remarkable boulder on the south side of its rocky summit. Brown hill at the north-east point of the island, 406 feet high, is connected with the island by a low sandy isthmus and sea wall, enclosing a lagoon which dries at low water.

The island is bold and hilly, the east coast being very steep and rugged, and the north coast high and bare. At about 1¼ miles northward of its south point the island is nearly divided, being only joined by a low neck of land.

Brine point, the south point of Yön-dai-san, is low, terminating in a cliff.

Un-chang bay.—The west coast of Yön-dai-san forms several bays, none of which, however, with the exception of Un-chang, afford any shelter from the southward. This bay will accommodate two or three vessels drawing less than 16 feet. There is a large fishing village and temple in the bay, and the slopes of the hills above the village are cultivated with corn, millet, cotton, and rice.

Anchorage.—The best berth is in 20 feet (mud bottom), with the south entrance point in line with the east extreme of east Cone island.

Supplies.—Fish may be procured for Korean copper coin, or by barter.

DOUGLAS INLET, an extensive arm of the sea, the entrance to which lies between Kö-je-do (Cargodo) island and Brine point (Yön-dai-san island), is about 16 miles deep.

Red rocks, a group of four rocky islets, 30 to 95 feet high, lie off the entrance to Douglas inlet, at 4 miles W. by S. from Brine point; the eastern rock is the highest. There is foul ground between them, and they should not be approached within a distance of 2 cables.

KÖ-JE-DO ISLAND, the north coast of which forms the south-west side of the entrance to Douglas inlet, is indented and mountainous. The north point of Kö-je-do is 2¾ miles distant from the north-east point, the coast between being bold, with bare hill sides.

Anchorage may be had in Pa-tung bay, one mile S.E. of the north point of Kö-je-do. There are depths of 3 to 5½ fathoms over the bay, with shelving bottom.

On the west side of the North point of Kö-je-do is a narrow inlet 2 to 3 miles deep in a southerly direction. From the western point of this inlet the coast of Kö-je-do trends south-westward into Sylvia basin.

SYLVIA BASIN.—The south-west part of Douglas inlet is a large basin, which, from the few soundings obtained in it, appears to have an even depth of 12 fathoms over it.

Sunday island, situated in the southern part of Sylvia basin, is nearly 3 miles long (north and south), and 1¼ miles broad. The island is indented on both sides by a deep bay, on the narrow neck of land between which, is a village. The summit of the island. 1,040 feet high (over the northern shore), has a small clump of trees on it, and appears as a conspicuous cone when seen from the entrance to Sylvia basin. Off the north point of Sunday island, just west from it, is a small islet, and to the north-eastward of the same point are three islets, the outer of which is about 1½ miles distant.

Narrow pass.*—Situated about 6 miles S.S.W. from the north point of Sunday island, is a narrow strait about 500 yards wide between its entrance points, which bear from each other about North and South. Off the southern point is a depth of 3 fathoms, and off the northern 4 fathoms. From the entrance across to the north point of Sunday island there is a depth of 7 fathoms.

Cone islets, a group of three conical islets, the eastern of which (380 feet high) is the highest, lie in an E.S.E. and W.N.W. direction at about 2¾ miles N.W. by W. from Brine point. A black rock, 49 feet high, lies 2 cables E.S.E. from the eastern islet; this rock should not be approached within a distance of 2 cables, as a rock which dries at low water spring tides, lies a little over a cable E.S.E. from it. The channels between the Cone islets should not be used.

Tai-pong island, lying close off the north-east point of Kö-je-do, is bold with cliffy sides and a remarkably smooth cone-shaped summit. Its north-west face is cultivated, and terminates in a shingle beach on which is a village.

Balfour rocks, a cluster, the highest of which is 14 feet above high water, lie 6 cables N.N.W. from Tai-pong island. Sunken rocks extend 2 cables E. by N. ½ N. from the highest rock.

Wedge island appears shaped as its name implies, except when viewed from north-east or south-west, when it takes a conical form; it is 792 feet high and is steep-to on all sides at half a cable distance.

The channel between Tai-pong and Cone islets is 7 cables broad, with a depth of 12 to 20 fathoms in mid-channel. To clear Balfour rocks, after passing Tai-pong do not shut in the eastern Red rock with Tai-pong island until the west extreme of Wedge island is in line with the north point of Kö-je-do bearing W. ¼ N.

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* This pass was first seen from the summit of Sunday island, and a boat was subsequently sent to explore it, but owing to the hostility of the natives this could not be accomplished.—Navigating Lieutenant W. Pearce, R.N., 1875.

The channel west of Tai-pong island is 5½ cables wide, with depths of 7 to 15 fathoms, and is the best, when proceeding into Sir H. Parkes sound from the southward. Both shores are clear with the exception of a sunken ledge which projects 1¼ cables from the centre of Tai-pong. Pass to the southward of Wedge island.

The Tides set with a velocity of about 3 knots an hour through these channels.

Neuk-do, a bold island half a mile in length, lies 1½ miles N.W. of Yön-dai-san (Borlase) island. Its summit is a level ridge 350 feet high, and there is a village on the beach at its north-east extreme. A rocky ledge connects this beach with a small islet one cable east of it.

Ung-chön bay on the mainland N.N.E. of Neuk-do, contains two or three villages, at one of which the governor of the district resides; and on the hills are remains of ancient defences. The bay is very shallow.

Three small islets lie between Ung-chhön bay, and the north-west point of Yön-dai-san.

Two bare islands lie north and north-west of Neuk-do.

SIR H. PARKES' SOUND, a continuation of Douglas inlet to the westward, has high mountainous shores, with barren ridges, on one of which is a remarkable boulder or crag having the appearance of a martello tower. At the head of a narrow arm of the sea, in the north-west corner of the sound, is the town of Ma-san-pho. Between Ung-chhön bay and the narrow pass leading to Ma-san-pho, the coast is indented with small shallow bays, at the head of which there are villages and cultivation; the only one affording anchorage being An-guk bay. Numerous islets lie off this coast.

The following islets and dangers lie in the route to Ma-san-pho.

Saddle island, 1½ miles N. ¾ W. from Wedge island, has steep sides and a rounded summit, depressed in the centre. A rocky ledge, partly above water, extends one-third of a mile N.N.E. from it.

Aston island, about 150 feet high, is narrow and about half a mile long; its western end being bare and steep-to.

Douglas rock, steep-to on all sides, lies one cable north of the centre of Aston island.

Anchorage may be had to the northward of the west end of Aston island, in 5 fathoms (mud bottom), protected from seaward.

Cho-a-söm island, half a mile long and one-third of a mile broad, lies isolated midway between Sir H. Parkes' sound and Sylvia basin; it is steep-to on the northern shore.

Channel reef, a rocky patch about three-quarters of a cable in diameter, lies three-quarters of a mile W. ½ S. from Aston island. Two rocky heads show at low water, towards which time of tide the sea breaks on it; there is a depth of nine fathoms all round it. The cliffy shoulder on the east extreme of Tai-pong island showing over the slope of Wedge island, bearing S.E., leads 2½ cables clear of the reef and 4¾ cables north of Cho-a-söm island.

PU-TO, the largest island in the sound, is in the form of a star-fish, having five protruding spurs from a common summit. There are a few bushes here and there, and the island is darker in colour than the neighbouring hills and islands. The two eastern spurs enclose a small harbour, at the head of which is a village; and its sides are steep-to within half a mile.

Anchorage.—Good anchorage will be found close off a small bay on the western side of Pu-to, in 6 fathoms, mud bottom; sheltered from seaward.

Ha-do and Belam rock.—Between Pu-to and Aston islands is the smooth bare islet Ha-do, 3 cables east of which is Belam rock, a double black rock 16 feet high.

Round island, 148 feet high, 2 miles N.W. of Pu-to, is smooth and green, and steep-to all round.

Carpenter rock, a small black islet, 33 feet high, lies in the fairway to Ma-san-pho reach, and may be passed at a distance of half a cable.

MA-SAN-PHO REACH, the entrance to which, 5 cables wide, is named "The Gate," is perfectly free from dangers. On either side are treeless hills, bare in winter, but in summer covered with grass, and which near the entrance, slope steeply to the water's edge. The general depth over the reach is 7 fathoms, but it shallows gradually as the town of Ma-san-pho is neared, until at one mile from the town the depth is 4 fathoms. On the west shore of the reach, at 1½ miles from "The Gate" is an immense grave cut on the side of the hill, in the shape of a horse-shoe. Several small inlets with villages at their heads open into this reach.

Satow island, lying 1½ miles S. by E. from the town, is green and bare of trees; it may be passed at one cable's distance.

Ma-san-pho, the principal village or town in the neighbourhood containing about 400 houses, is situated on a gentle slope, 4 miles N.N.W from "The Gate," at the foot of a high range, which is peculiarly marked by a fan-shaped patch of bare soil. The town has a sea wall, and three piers that dry at low water spring tides, and there is a boat camber. Half a mile eastward is the old village of Ma-san-pho, and a few miles inland is a large town, Chhang-wön, the residence of the governor of the district. North-west of Ma-san-pho is a range of hills, the lower slopes of which are cultivated, and in the valleys are numerous villages.

Inner reach.—An inner reach branches off E.N.E. from the town and at 2 miles from it is a narrow pass opening into a shallow sheet of water, extending several miles to the north-east. On the shores of this lagoon are salt pans, and the country is flat. On the hills are some loosely-built, loopholed stone turrets.

Anchorage may be had anywhere, according to draught; a depth of 3 fathoms being found at half a mile from the town.

The COAST, from the entrance to Ma-san-pho reach trends S.S.E. for 4½ miles to Atkinson point, whence it turns to the south-west into Sylvia basin.

KUSAN-CHIN BASIN, the entrance to which, 2 cables wide, is immediately west of "The Gate," is an oval sheet of water about 2 miles in diameter, and completely land-locked. In the channel is a depth of 5 to 6 fathoms, and 3½ fathoms one mile inside the basin, but it shoals towards the head. There is a large village on the northern shore.

Three-quarters of a mile south of Kusan-chin basin is a narrow inlet one mile deep in a westerly direction, having depths of 4 to 6 fathoms in it.

North of Atkinson point is a bay half a mile wide at the entrance extending 1½ miles in a westerly direction, with wooded hills around it; on a summit to the northward of the bay is a conspicuous clump of trees. At the head of the bay the land is low.*

Shi-ra island, 286 feet high, lies close off Atkinson point; it has a conical summit.

A rock, about 10 feet high, lies 2¼ miles S.W. by W. ¾ W. from Cho-a-söm island.

ANGUK BAY, north-east of Pu-to, and on the north shore of Sir H. Parkes' sound, is one mile wide, and 2 miles deep, with a depth of 4 to 5 fathoms over an even bottom of mud. There are several villages on the shores of the bay, and two islets in it. Bold and rugged hills lie north and north-east of the bay, and in the latter direction is the tower-shaped crag before mentioned (p. 112).

Anchorage.—Small vessels will find better protection by anchoring in Ferguson cove, immediately north of the eastern entrance point.

Frederick rock, which covers at half tide, lies 5½ cables N. by E. from Belam rock. To clear it, pass eastward of Belam rock, after which keep the west extreme of Cho-a-söm island open of Belam rock.

CAUTION.—Approaching Anguk bay from the southward take care to avoid Frederick rock, after which pass the east entrance point at one cable's distance.

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* Water could be seen at the back of this bay, probably an arm of Sylvia basin.—Lieutenant A. Carpenter, R.N., 1882.

DIRECTIONS.—DOUGLAS INLET from the eastward.—Borlase peak is very conspicuous, and is a good guide to Douglas inlet. Brine point, off which there are tide rips, should be rounded at 1½ cable's distance, whence steer to pass 3 cables east of the low rock off the Cone islets, after passing which steer N.W. for Saddle island until Balfour rocks bear S.W. ½ S., taking care to avoid being set on to the sunken rock lying north-east of them, by keeping the eastern Cone islet open half its breadth of Brine point. Then steer to pass northward of Wedge island, and pass Channel reef with the cliffy shoulder on the east extreme of Tai-pong island showing over the slope of Wedge island, bearing S.E.; this mark leads 2½ cables from the reef, and also 4¾ cables north of Cho-a-söm island.

Having passed Channel reef, the same marks kept on lead close past Pu-to island, and after passing eastward of Carpenter rock, steer in mid-channel up Ma-san-pho reach.

Entering Douglas inlet from the southward, pass half a mile eastward of Red rocks (*see* p. 110), whence steer for the channel between Kö-je-do and Tai-pong island, and in mid-channel westward of Wedge island, after passing which proceed as before directed.

If bound for Sylvia basin, when off the north side of Cone islets steer N.W. by W., keeping Brine point just touching the north extreme of the Cones on astern. This course will lead northward of Balfour rocks, and close to the north end of a small round islet situated about one mile north-west from Balfour rocks. From abreast of this latter islet, which has a depth of 20 fathoms quite close to its north end, continue the course before mentioned (N.W. by W.) for a further distance of 2 miles, when the summit of Sunday island will be seen well open of the northern extreme of Cargodo island bearing S.W. by W.; when steer towards it on that bearing, passing midway between the points of Cargodo island and off-lying rocks (visible) in not less than 12 fathoms. When nearing Sunday island remember that the three islets lying to the north-eastward of it have deep water around and between them. No covered dangers were seen by the *Sylvia* when passing from Brine point to Sunday island.

ASHBY INLET, between Yön-dai-san island and the mainland is merely the estuary of the Nak-tong river which opens into it between extensive sand banks and low islets. There are depths of 6 to 11 fathoms sandy bottom, on a line between Borlase peak and Point island. At 1¼ miles north of this line there is only a depth of 3 fathoms, and thence northward it shoals rapidly towards the sand banks off the river entrances.

Nak-tong river, about 170 miles long, drains about 4,000 square miles of country (province of Kyeng-sang-to) and is probably navigable for small craft for upwards of 100 miles. Its entrances being exposed to seaward are barred, except to boats at high water. About 11 miles up, the river appears to flow in a deep bed, and at this distance is the town of Kimhai. Between Kimhai and the bar the river flows in two channels, between which are extensive flat islands, some covered with reeds and others cultivated, and with clumps of trees on them. In these channels the depth is about one fathom at low water, but near the bar the channels are broken up into numerous creeks lying between sand banks, in which at low-water there is a depth of only 2 feet.

The Straits north of Yön-dai-san (Borlase island) are very shallow, there being only a depth of a few feet at low water. A narrow channel navigable only by boats, with a depth of 9 feet in it at low water, takes an E. by N. ¾ N. direction from the south end of the northern of the three islets lying off the north-west point of Yön-dai-san, to the south point of a level topped island (Yal-ma-do), passing which, at a distance of one cable, the channel trends in a curve towards the north-east point of Yön-dai-san, with a depth of only 5 feet at low water. Thence passing through fishing stakes to Brown hill and over a flat inside the breakers, the channel leads into the western mouth of the Nak-tong river. Long flat-bottomed barges navigate this branch, carrying reeds and brushwood. A ruined fort is situated on a hill near the western entrance point. Fish and wild fowl are abundant.

The north coast of this strait trends E.N.E., 4 miles from Ung-chhön bay to the mouth of Nak-tong river, and is irregular and bare, having shallow flats that dry, extending half a mile to one mile from it.

Anchorage for vessels drawing less than 14 feet may be had at 3 cables N.E. by N. of the north-west point of Yön-dai-san; the river, however, cannot be approached nearer in that direction.

Tides.—It is high water, full and change, at Pu-to island, at 8h. 47m.; springs rise 7½ feet, neaps rise 5½ feet. At Ma-san-pho it is high water at about half an hour later.

Currents.—The general direction of the surface current between Tsu sima and Fusan is north-westerly with a rate of about one knot an hour, except between the off-lying islands, where the tidal streams are felt. The north-east monsoon appears to give a more westerly direction to the usual set. Between Tsu sima and Hirado the current sets to N.E. at about the same rate.*

Anchorage may be obtained, though it is very exposed, at the entrance to Ashby inlet in 6 to 7 fathoms, mud bottom, with Brine point bearing S.W. by W., and Brown hill point bearing N.W. After shoaling to 5 fathoms, the sand banks rise abruptly. A very conspicuous tree is seen nearly in the centre of the inlet when approaching.

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* Lieutenant A. Carpenter, H.M.S. *Magpie,* 1882.

Point island lies on the east point of the entrance to Ashby inlet.

TSAU-LIANG-HAI (FUSAN) HARBOUR* discovered by Broughton and named by him Chosan in October 1797, is formed on the south-east coast of Korea (in lat. 35° 6′ N.) by a deep indentation in the mainland, in the middle of which lies a large island (Zeto Yeito or Deer island) nearly 4 miles in length in a N.W. and S.E. direction. From its position in the bight, Deer island divides it into two spacious anchorages, the northern of which affords complete shelter from all winds. The entrance is between cape Young on the north and cape Vashon (on Deer island), on the south, which bear from each other N.N.E. ½ E. and S.S.W. ½ W., and are 3 miles apart; from thence the harbour trends in a N.W. direction 4½ miles, and is from one to 2 miles wide.

On the shores of the harbour are the city of Fusankai (Korean), and the small Japanese settlement of Sorio, where the Japanese traders are allowed to reside.

No perceptible trade is carried on in the harbour. A few boats were occasionally seen moving about, but their cargoes generally consisted of firewood and straw. The population varies according to the season of the year; in the summer, when probably only the regular inhabitants are met with, from 6,000 to 8,000 may occupy the four villages at the head of the harbour; but during the commencement of the fishing season, thousands from the interior press to the sea shore, impromptu villages spring up by hundreds along the coast, composed of bamboos and mats, and all Korea appears to be intent on catching, curing, and drying the ribbon fish.

The natives (Koreans) are very uncouth, noisy, and excessively filthy in their dress, persons, and dwellings, added to which they are most determined and dexterous thieves. The Japanese settlement of Sorio in the southern part of the harbour, contained in 1881 about 2,000 inhabitants. It consists of about 20 houses and a fir grove surrounded by a wall, and there is a camber where the junks lie sheltered.

Imports consist of copper, spelter, and tin. Exports—hides, horns, tiger and bear skins, and seaweed jelly; the total value of both amounting to about 1,000,000 dollars in 1881.

The hills in the vicinity of Tsau-liang-hai, and in fact, excepting Deer island, all the country in this part of the eastern division of the Korea is singularly destitute of wood. A few pines and firs are arranged in mathematical order around the cemeteries, but the hills are most of them conical, and covered with rank grass to the summit, presenting in summer a fresh green appearance, but in autumn and winter a brown and barren look, with the addition of large patches of rock and stones cropping out. These ranges reach from an elevation of 800 to 2,000 feet, and are, generally speaking, nearly parallel with the coast line, having spurs running down to the shore, forming valleys, which are turned to account for the cultivation of rice and other grain crops by the natives (the female portion of them), but apparently only in sufficient quantities for their own immediate wants.

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* *See* Admiralty plan:—Tsau-liang-hai harbour, No. 1,259; scale, *m* = 2·2 inches.

The slopes of Deer island are covered with a quantity of scrub, composed of stunted oak, while numerous trees of a larger description crown the summit, and are found on the south-east part of the island.

Channel rock.—At 3 miles within the entrance are several rocks above water, one of which (Channel rock) 6 feet high, lies 3 cables from the north shore, and the passage on the south side of it is much narrowed by foul ground extending from Deer island; otherwise the harbour is clear of danger, and the soundings gradually decrease from 12 fathoms at entrance to 3 fathoms at its head.

Fusan Kai, a large walled Korean town, is situated on the northern shore of the harbour, and although said to be an important city, it is far from presenting an imposing appearance. Some cannon (said to be old and of native manufacture) are mounted on the walls.

Supplies.—The *Actæon* obtained a few bullocks and chickens, and a very small quantity of vegetables, principally onions and leeks. A few pigs were seen, but no sheep or goats. Horses were seen on Deer island in June. Fresh beef may be obtained through the Japanese authorities.

At the end of November, pheasants, quail, snipe, and water-fowl were abundant, and nine hog-deer were shot during the week on Deer island. No fish was to be had in June, but in November and December immense quantities of the ribbon fish were being taken by the natives, and readily parted with for dollars. No wood, or fuel of any kind, is to be obtained from the mainland. Water can be obtained at several places, in fact nearly every valley has its stream. The *Actæon* found every facility for watering at a stream situated at the north part of Deer island.

Mudge island, lying one mile North of cape Vashon, is 450 feet in height. Its north and east sides rise abruptly from the sea, and 7 to 9 fathoms will be found close to the rocks; but its south end, which is low, is connected with Deer island by a ledge, which in N.E. gales breaks heavily. Shallow water also extends a cable from the west shore of the island.

CAPE VASHON, the south-east point of Deer island, is a bold headland, 825 feet high, having a few detached rocks round it, but all within half a cable of the foot of the cliff; and when seen from the northward is recognized by a long white streak which passes over its entire length. At one mile South of the cape is Vashon rock, 120 feet high, and quite steep-to, and from being solitary, will, even in thick weather, be readily distinguished from the Black rocks (90 feet high), which form a group half a mile South of cape Young, the north point of entrance.

Directions.—Approaching Tsau-liang-hai harbour from the southward, cape Vashon will be readily recognized. To proceed to the best anchorage in the bay, that off the Japanese settlement of Sorio;—after rounding cape Vashon and Mudge island, both of which may be passed tolerably close—steer N.W. ¼ W., passing 2 cables south of the Channel rock (6 feet high) and midway between it and the rocky ledge extending 3 cables northward of Deer island, on which ledge some of the small rocks show at low water.

The Japanese settlement, with its neat white houses, situated at the foot of a high range of bare mountains, will readily be recognized. Continue the N.W. ¼ W. course until the extreme rocky point of the Japanese settlement, or the southern jetty of the small camber, is in line with the high peak (1,066 feet high) 1¼ miles W.S.W. of it, bearing W. by S. ¾ S nearly, when alter course for the jetty.

Bound for Tsau-liang-hai from the north-eastward, Chaldron mountain, 2,040 feet high (not quite 6 miles N. by E. of cape Young) will, in clear weather, be seen from a considerable distance, and forms a good landmark. Approaching the harbour, the cape will be readily recognized by the five Black rocks, the highest of which, 90 feet high, is half a mile south of it; the outer four form a group lying north and south, with an isolated one in-shore, 1½ cables from the cape. There is a very narrow channel, with a depth of 10 fathoms, between the outer group and the inner rock.

If intending to use the anchorage at Mudge island, having rounded the Black rocks, which have no hidden danger near them, steer W. by S., and giving the island a berth of 2 cables, anchor in about 6 fathoms, water, with cape Vashon bearing S.S.E. and the islet near cape Young N.W. by W. ¾ W.

If proceeding up the harbour, from 2 cables south of the Black rocks, a W.N.W. course leads up, passing 2 cables south of Magnetic head,* a bold headland, 565 feet high, and not less than that distance from any known danger. On passing Channel rock, use the precautions already recommended for clearing Deer island ledge, and anchor as before directed.

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* Named so by Broughton from its affecting his compasses. His vessel anchored in the bay on its west side.

Working in for the anchorage at the head of the bay, long boards may be made until the first rock, 8 feet high, west of Magnetic head is passed, when the channel becomes narrowed by the ledge off Deer island. The Channel rock may be passed on either side, but not so any of the other rocks which show in the harbour.

The bay immediately west of Magnetic head is not to be recommended even as a temporary anchorage, as even a light S.E. wind sends in a most unpleasant sea; it is shallow, so that small vessels cannot get sufficiently close in to find shelter from the head, and they would find a difficulty in working out.

Anchorage. — Vessels intending to make only a temporary stay will find excellent shelter in 4 to 6 fathoms, mud, on the west side of Mudge island, anchoring on the before-mentioned bearings, or with the south-west extreme of the island touching cape Vashon, bearing S.S.E., and the most southern of the Black rocks open its own width northward of the island, E. by N. ½ N.

Good anchorage may be had in 5 to 6 fathoms, black mud, at a quarter of a mile east of the jetty at the Japanese station. Should a nearer berth to Deer island be chosen, it will be necessary to moor, as the tides set along the shore of the island, and the anchor would probably soon be fouled.

Inner entrance.—Steam, or sailing vessels with a *leading* and commanding wind, coming from the southward and drawing under 10 feet, will find a good but narrow channel between the west side of Deer island and the mainland at high water. From a mile east of Blakeney island, which, however, may be passed on either side, steer N. by E. ½ E., and having run about 5 miles, the south-east point of Deer island will bear E. by S. ½ S., and the wooded hill of the Japanese settlement, seen over the low point of Deer island, N. ¼ E. From thence steer North, gradually closing the north-west point of Deer island, which is nearly a flat terminating in a shingly spit; round the point at less than a cable from it, being careful to use a quick helm, especially with the flood stream, which sets through with considerable strength, and catching a vessel on the bow, might force her over on the flat, extending out from the Japanese settlement a full cable's length from the shore; should a long vessel be caught by the stream, and unable quickly to recover herself, an anchor should be immediately let go. To avoid this flat, when the shingly point bears South, steer East until the opening into the camber bears North, and then for anchorage.

The Cove.—The coast for some considerable distance south-west of Tsau-liang-hai is much broken up by small bays and other sinuosities, but few of them appear to be of any value to the mariner. At 5¼ miles west of cape Vashon and 4 miles north of Blakeney island, is a bay on the west side of which is a small bight named the Cove. The bay is well marked by an island (Point island) rather larger than Blakeney, 295 feet high, having three other rocks in its neighbourhood, on the west side of the entrance. One of these rocks, 95 feet high, has a rocky spur running out to the northward one cable. Running up the bay, the entrance to the Cove will open out, and anchorage close to the rocky point on its north side may be obtained in 3 or 4 fathoms, well sheltered and landlocked.

In making for the Cove from the southward, take care not to run into Open bay, immediately eastward of it, as it forms a cul-de-sac into which a heavy sea rolls with southerly winds, and a vessel, if once embayed, might experience a difficulty in working out.

Tides.—It is high water, full and change, in Tsau-liang-hai harbour at 7 h. 45 m.; springs rise 7 feet, neaps 5 feet.

BLAKENEY ISLAND, bearing from cape Vashon S.W. ½ W., distant 7 miles, is a small rocky islet, 156 feet high, 3½ cables long, N.E. and S.W., and one cable broad at its widest part; at two cables eastward of it is a detached cluster of rocks, the highest being 25 feet above water.

CRAIGIE and AUNT ISLETS lie south of Blakeney island directly in line between Sentinel island and Tsau-liang-hai harbour, at from 6 to 11 miles from the coast.

Craigie islet, the southern, is N.N.E. ¾ E. 23 miles from Sentinel island, and 6 miles S.S.W. of Blakeney island; it has steep sides with a wooded summit 70 feet in height. A small reef extends off from its western side.

Aunt islets, midway between Craigie islet and Blakeney island, are two islets very similar in appearance, forming in three hummocks from 40 to 60 feet in height, and lie east and west, their bases being joined. A reef extends one cable from their western side.

Neither of these groups should be passed too closely; no dangers were observed near them from elevated positions on the neighbouring coast.

TSU SIMA (Japanese, originally Korean), situated at the entrance to the sea of Japan, in the Korea strait, is 37 miles in length N.N.E. and S.S.W. Some reefs and rocks off Mame saki, its south-west end, and Tayo saki its north end, show; a berth, however, of 1⅕ miles will clear everything.

At high water Tsu sima becomes a double island, a deep Sound dividing it into two parts. The southern portion is mountainous (2,126 feet high), and on the north of its range is a double sharp peak (1,700 feet high), named Uyama, forming like asses ears when bearing S.E. The northern portion is much lower, and somewhat level in appearance, except at one-third from its north-east extreme, where it rises into a flat topped mountain, which has a double peak on the east. For vessels of large draught there is but one navigable channel into this Sound, the western one; that on the east side of Tsu sima being an artificial canal about 200 yards long by about 40 feet wide. It is made through a ridge about 60 feet high, and is only available for boats and small craft at high water.

The centre of the western entrance is 5 miles northward of Uyama peak, which cannot, if seen, be mistaken, and will from a considerable distance guide to the entrance; but when close to the channel it becomes shut in by the high land of Osaki.

TATE MURA (Tsu sima sound).*—The entrance to this spacious inlet on the west coast of Tsu sima is 1½ miles wide, between Usi sima lying off Karasu saki (the north entrance point), and Osaki. Reefs extend one cable south of Usi sima, and 2½ cables north from Osaki, and, although the bottom is very uneven, the only other danger, except from the detached rocks which closely fringe the shore, is a sunken rock lying off the southern shore at two-thirds of a cable from the north side of Strata islet, which is a low mass of slate stone, somewhat wedge-shaped, dipping to the southward, lying about one mile within the entrance. To clear this danger, do not bring the two low rocks, lying off Osaki, the south point of entrance, to bear northward of W. ½ N. until Flat islet (56 feet high) bears S.E.; or, should Flat islet not be readily recognized, until the conspicuous islet Usi sima, lying off the north point of entrance, bears N.N.W., when a course may be shaped for any part of the Sound.

Flat island lies one mile S.E. by E. from Strata islet, in the centre of deep creeks indenting the southern shore: it should not be approached within one cable.

Tsu sima sound possesses a large number of small harbours and basins quite landlocked and sheltered from all winds; they are arms branching off from the main body of the Sound, and all of them have deep water. The sides of these little havens are so steep, that vessels may moor to the rocks and trees, and lie as quiet as if they were in a dock; the only thing to move them being the rise and fall of tide.†

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* *See* Admiralty plan:—Tsu sima sound, No. 2,710; scale, $m = 3$ inches.

† The water appears to have receded since last survey, as the depths were found to be less than those given on the chart, and rocks marked awash are now 6 feet out of the water.—Navigating Lieutenant Balliston, H.M.S. *Vigilant*, 1875.

Ima-haru bay.—Creasy creek, Water basin, Mussel cove, and Oyster sound, are all on the south side of the western portion of the sound branching off from Ima-haru bay, the entrance to which is on either side of Flat island, and may be safely entered. Of these, Oyster sound and Mussel cove are the largest and most eastern; there is some foul rocky ground between Mioban sima (which lies at the entrance to the two latter), and the island to the south-west of it. Vessels intending to occupy an anchorage in either of these two harbours, must therefore pass eastward of Mioban sima, from the east point of which the mid-entrance to Oyster sound bears S.E. ½ E., distant two-thirds of a mile, and that of Mussel cove S. by W. ¾ W. half a mile. Creasy creek and Water basin are close together, in the S.S.W. corner of the Sound, and are, for steamers, easy of access; the latter possesses a stream of excellent water, in which a number of small trout have been found.

If desirous of proceeding beyond the anchorages afforded by the west portion of the Sound, from the centre of the western entrance, steer E. by S. ½ S.; this course leads northward of Ino saki, to the eastward of which is a peninsula with a square block and looking like an island. The channels on each side of this peninsula are deep, the southern one particularly so, and lead into an almost endless variety of friths and deep-water inlets, sufficient to afford accommodation to a large fleet, where they would be quite sheltered and free from the observation of passers by.

Anchorage.—The *Actæon* anchored in 9 fathoms in Ima-haru bay, about 2 cables south of Observatory rock, which may be known by its being the southernmost of two small rocks, connected with the mainland at low water; the northern one has a small shrine on it. This is a convenient anchorage for sailing vessels, or if only intending a short stay; under other circumstances one of the others should be sought. Vessels damaged so as to require to be hove down, would find Tsu sima sound well adapted to careening purposes. There are three small villages on the shores of Ima-haru bay, the northern of which, Osaki, is immediately south of Observatory rock.

At the head of Oyster sound off the village of Kurase there is good anchorage in 10 fathoms water, black mud bottom, good holding ground. As squalls blow very fiercely down the several valleys it is advisable to moor with swivel.

Supplies.—Wood, water, and vegetables are abundant, but were very scantily supplied to H.M.S. *Actæon*. Some hundred head of horned cattle were seen, and two were procured, also a small quantity of poultry; sheep are not known. A few pigs were seen, and the cornfields swarmed with pheasants. Coal has been found on the north-west side of Tsu-sima.

The seine afforded but little fish, although the native boats each morning brought in large quantities. The rocks in some places were covered with oysters and mussels, some of extraordinary size.

Tides. — It is high water, full and change, in Tsu sima sound at 8h. 30m., and the rise is 8 feet. Both flood and ebb are rather strong at the entrance.

Itsuhara* bay (Fatchion), on the east side of Tsu sima in lat. 34° 12′ N., long. 129° 16′ 40″ E. (approx.) is open from E. by S. to S.E. by E., and with strong winds from that quarter is not a desirable anchorage. It is about 4 cables wide at its entrance, and half a mile deep, with two bights one on its north-west and the other on its south-west side.

A small shoal extends off the southern point of the bay, but depths of 5 and 6 fathoms will be found close off the northern shore. The southern arm of the bay is shoal, and affords no good anchorage. The large town of Itsuhara, the capital of Tsu sima, is situated in a valley between high ridges of hills in the bight on the north-west shore of the bay, and extends across to Asu harbour one mile northward; in 1875 it contained about 3,000 inhabitants. There appears to be a considerable trade from this port, the junks being securely moored under a substantial mole. The principal trade is with Sorio (Chosan harbour) Korea.

On the side of the hill over the north point is a stone beacon, and it is intended to erect a small lighthouse.

Asu harbour, a little more than a mile to the northward of Itsuhara, is small, and dangerous to enter; the channel between the shoals which nearly fill the entrance being less than one cable wide.

Ajiro bay† (Nishi no Mara), at the north-east end of Tsu sima, in lat. 34° 38′ 50″ N., long. 129° 27′ E. (approx.),is reported by Japanese surveyors to be a good and safe anchorage at all times; the best shelter is to be found in 9 to 11 fathoms, mud bottom, about 2½ cables north-west of Kaminari saki (on the northern shore), and to the westward of two small islands. There is a patch of 3¾ fathoms northward of the islands, but the bottom is mud with a substratum of rock, and not good holding ground.

KOREA STRAIT divides the south-east coast of Korea from the south-west coast of the Japan islands; it is divided into two channels by Tsu sima.

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* *See* Admiralty plan:—Itsuhara and Asu harbours on sheet No. 874; scale, $m = 3$ inches.

† *See* Admiralty plan:—Ajiro bay on sheet No. 874; scale, $m = 3$ inches.

The Western channel is 34 miles wide, between Sentinel island and the south point of Tsu sima, narrowing to 25 miles between the north point of that island and Tsau-liang-hai; its greatest depth is 90 fathoms near the west coast of Tsu sima. H.M.S. *Dove* in crossing the Korea strait from the Goto islands in 1861, after decreasing the soundings from 83 to 53 fathoms in 15 miles on the parallel of 33° N., obtained a sounding of 23 fathoms in long. 127° 38′ E. On sounding again one mile N.N.E. of this position, there were 56 fathoms, deepening again to 81 fathoms at 11 miles in the same direction.

The Eastern channel is 25 miles wide at its narrowest part, between the south point of Tsu sima and Iki island; its greatest depth is 65 fathoms.

CHAPTER III.

SEA OF JAPAN;—EAST COAST OF KOREA, AND RUSSIAN TARTARY—GULF OF TARTARY AND RIVER AMÚR—TARTARY STRAIT—SEA OF OKHOTSK, AND KAMCHATKA.

Variation in 1884.

East Coast of Korea 5° W.
Coast of Tartary 6° W.
Sea of Okhotsk from 2° W. to 2½° E.
East Coast of Kamchatka 4½° E.

The SEA of JAPAN, bounded on the east and south by the Japan islands, and on the west and north-west by the coasts of Korea and Russian Tartary is about 900 miles long, N.N.E. and S.S.W., and 600 miles East and West, at its broadest part. Surrounded by land on all sides, this sea is only accessible by the following narrow passages:—To the south by the Korea strait, which connects it with the China sea; to the east by La Pérouse and Tsugar straits, by which it communicates with the Pacific; and to the north by the gulf of Tartary, through which it communicates with the sea of Okhotsk by the gulf of Amúr; this sea is, as far as is known, clear of rocks or dangers with the following exceptions*:—

LIANCOURT ROCKS are named after the French ship *Liancourt*, which discovered them in 1849; they were also called Menalai and Olivutsa rocks by the Russian frigate *Pallas* in 1854, and Hornet islands by H.M.S. *Hornet* in 1855. Captain Forsyth, of the latter vessel, gives their position as lat. 37° 14′ N., long. 131° 55′ E., and describes them as being two barren rocky islets, covered with guano, which makes them appear white; they are about a mile in extent N.W. by W. and S.E. by E., a quarter of a mile apart, and apparently joined together by a reef. The western islet, elevated about 410 feet above the sea, has a sugar-loaf form; the easternmost is much lower and flat-topped. The water appeared deep close-to, but they are dangerous from their position, being directly in the track of vessels steering up the sea of Japan for Hakodate.

MATSU SIMA (Dagelet island) is a collection of sharp conical hills, well clothed with wood, crowned by an imposing peak (4,000 feet high) in the centre, in lat. 37° 30′ N., long. 130° 53′ E. It is 18 miles in circumference, and in shape approximates a semicircle, the northern side, its diameter, running nearly E. by N. and W. by S. 6¼ miles. From each end the coast trends rather abruptly to the southward, curving gradually to the east and west, with several slight sinuosities until meeting at Seal point, the south extreme of the island, off which is a small rock.

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* *See* Admiralty chart:—North-west Pacific ocean, No. 2,459; scale, $d = 0\cdot75$ of an inch; Japan and part of Korea, No. 2,347; scale, $d = 2\cdot2$ inches; Kuril islands from Nipon to Kamchatka, No. 2,405; scale, $m = 0\cdot03$ of an inch; and sea of Okhotsk, No. 2,388; scale, $m = 0\cdot03$ of an inch.

There are several detached rocks along its shores, principully, however, on the north and east sides, some reaching an elevation of 400 to 500 feet. They are all, like the island, steep-to, and the lead affords no warning, but none of them are more than a quarter of a mile from the cliffs, except the Boussole rock, the largest, which is 7 cables from the east shore of the island. Hole rock on the north shore is remarkable, from having a large hole, or rather a natural archway through it, while nearly abreast it on the shore is a smooth but very steep sugar-loaf hill, apparently of bare granite, about 800 feet high.

The sides of the island are so steep, that soundings could only be obtained by the *Actæon's* boats, almost at the base of the cliffs, while at 4 miles to the southward, no bottom could be found at 400 fathoms; and 2¼ miles north none at 366 fathoms. Landing may be effected in fine weather, with difficulty, on some small shingly beaches which occur at intervals, but the greater part of the island is inaccessible.

During the spring and summer months some Koreans reside on the island, and build junks, which they take across to the mainland; they also collect and dry large quantities of shell fish. Except a few iron clamps, their boats are all wood-fastened, and they do not appear to appreciate the value of seasoned timber, as they invariably use quite green wood.

WAYWODA ROCK is said* to have been discovered by the Russian corvette, Waywoda. It appeared to be 12 feet high, 70 feet broad, and its approximate position is lat. 42° 14½′ N., long. 137° 17′ E.

The EAST COAST of KOREA, unlike the western coast, is steep-to at a short distance from the shore. A running survey was made by the Russian frigate *Pallas* in 1854 of its whole extent for about 600 miles, from cape Young to lat. 42° 31′ N., long. 131° 10′ E. Port Lazaref, Napoléon road or Posiette harbour, and the Tumen river were surveyed by her boats.†

The frigate had steady fair winds, and kept from one to 4 miles off shore, approaching even nearer at some parts, and following its windings.

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* Renseignements Hydrographiques sur la Mer du Japon, &c., 2nd edition, page 124, 1860.

† The description of the east coast of Korea is chiefly from the voyage of the Russian frigate *Pallas* in 1854 and of the French frigate *Virginie* in 1855.

The coast has a uniform appearance; sometimes, however, its character changes suddenly, and from being mountainous and rocky it becomes low and sandy, assuming its former appearance after a short interval.

The COAST from Tsau-liang-hai trends in a N.N.E. direction 63 miles to cape Clonard, the whole extent preserving a uniformly mountainous and desert character. Between the coast and the high mountain range, running parallel to it, are rows of sand hills which are detached from the range, and projecting towards the sea in abrupt points, form an unbroken series of little bays which give no shelter.

Tikmenef point, has on its south side an island of considerable size which appears to hide the mouth of a river or large bay. N. by E. $\frac{3}{4}$ E. 5 miles from Tikmenef point and about 2 miles off shore, is a dangerous rock nearly awash.

CAPE CLONARD, in lat. 36° 5$\frac{3}{4}$′ N., is the extremity of a rather low peninsula, which advances boldly towards the north-east, and is visible 18 or 20 miles off; it forms the easternmost point of this part of the Korea.

UNKOFSKY BAY.—Cape Clonard forms the south side of the bay of Unkofsky, the extent of which has not been determined; but which is 4 miles wide at its mouth, comprised between the peninsula and Crown point to the north-west. The trend of the bay is to the south-west; it has 17 to 12 fathoms at entrance, and 7 fathoms with good anchoring ground at 2 miles from its shores, but it is open to the prevalent autumnal winds, and those from the north-east in winter. It appears clear of danger throughout, but the north part of cape Clonard must be avoided, as foul ground extends a short distance from it.

The northern and southern shores of the bay have a marked difference in character. Those on the south are elevated, the hills of the main range here approaching the sea; they then retire at the centre of the bay, resuming their original direction parallel with the coast. The northern and western shores are of moderate height; the former consisting chiefly of abrupt or steep sandy cliffs of snowy whiteness, with hills of the same description. Several large settlements spread along the shores, the inhabitants being probably employed in fishing.

PING-HAI HARBOUR, in lat. 36° 36′ N., long. 129° 20′ E., is a small creek in the sandy coast surrounded by high hills. At its entrance is a conical-shaped island, which shelters the whole roadstead. On the side of the island is a large group of houses standing near the sea. The *Pallas* had 23 and 32 fathoms water within 1$\frac{1}{2}$ miles of the land; and the *Virginie*, which coasted it for 3 miles, had 27 fathoms. Moreover, the steep and rocky shores seem to show that they are steep-to; there was no apparent danger between the frigate and the shore, and the current averaged 10 miles to the north in twenty-four hours.

Three mountains rise to the south-west of Ping-hai, and three rounded summits of one sloping mountain at a short distance to the north. The mountains resemble each other; they are however so situate, N.E. and S.W., that their summits seem to rise one above the other.

Cape Pélissier.—From Unkofsky bay the coast trends in a northerly direction to a large round headland slightly advanced, named by the *Virginie* cape Pélissier. Its less mountainous character does not, however, dispel the appearance of sterility, rows of round sand-hills occurring for a considerable distance inland. To the W. by N. of the cape is mount Popof, a high mountain of regular pyramidal form, and the loftiest of those that occur near the shore.

The COAST.—From cape Pélissier the coast trends N. by W. 10 miles to Chiku Piyon bay,* thence N.N.W. for 110 miles to cape Duroch. Between these two capes there is not a bay worth mentioning; the coast appears steep, and there are a few houses near the water's edge.

Beyond the parallel of 38° N., the land becomes gradually depressed. Groves of cedar trees cover the sides of the sloping mountains. The Sedlovaya, or Saddle-shaped mountain, is the most remarkable elevation along the coast. Its two blunt summits, 5,525 feet high with an arched slope between them, rise about 5 miles inland in lat. 38° 10½′ N., the western summit being the highest. Several considerable mountains, having more or less pointed summits, surround this mountain on all sides, particularly on the north.

Several small islands occur near the coast north of mount Sedlovaya. They are mostly desolate and rocky, intermingled with high reefs.

Chagu Chien Dogu,† in lat. 38° 44′ N., is a small indentation of the coast, about half a mile wide, and a mile deep. Two islets lie half a mile west of its entrance, and they are connected with its high and rocky north extreme by a bed of rocks, some of which are uncovered. The islets at the south extreme of the bay are bare rocks, and serve as a refuge for innumerable seals and penguins. There is anchorage in this bay off the village of Chosen-do.

CAPE DUROCH, or Peschurof, forming the south point of Broughton bay, is a massive cliff presenting to the north-east a front

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* *See* Admiralty plan:—Chiku Piyon bay, on sheet of plans, No. 54; scale, *m* = 1·50 inches.

† *See* Admiralty plan:—Chagu Chien Dogu anchorage on sheet No. 54; scale, *m* = 0·58 of an inch.

8 miles long and bordered by rocks level with the water and close to the land. The depth was 104 fathoms at 5 miles to the east, and 23 fathoms at less than a mile north of the cape.

BROUGHTON BAY (Korea gulf), is 93 miles wide between cape Duroch on the south and cape Petit Thouars on the north, and 55 miles deep; and Yung-hing bay and port Lazaref at its head offer excellent shelter. The shores of the bay are winding and mostly low, and vessels can anchor off them in a moderate depth with safety.

The north and south shores of Broughton bay are commanded by lofty heights near the sea. The Belavenz mountains, about 15 miles south-west of cape Duroch, are respectively 6,092 and 5,884 feet above the sea ; and to the north at 24 miles in the interior, W.N.W. of cape Petit Thouars, mount Hienfung reaches the height of 8,114 feet. The shores, although wooded and verdant, are varied occasionally by waste lands and rocky cliffs.

After passing cape Duroch, a moderate sized bay will open out with a low sandy shore, and it probably affords good anchoring ground during southerly winds, as in general all the bays examined on this coast invariably do. A group of small islands and sunken rocks lie in the middle and north-west parts of this bay, on several of which a few cedar trees are growing. From the north extreme of the bay the coast again becomes winding and rocky, and gradually falls towards Felény point.

Felény point, with the islands adjoining it, is the southern boundary of a shelving bay, with depths of 18 fathoms, at a distance of 3 or 4 miles from the coast, and 5 fathoms within a few cables of it. Mian-tsin-liang point, the north extreme of this bay, is high and abrupt, and at a distance appears as an island, being separated from the shores of the bay by low land. A rocky islet, named Observation island, lies in the centre of the bay, at 1½ miles from the shore.

Mouchez island (or Khalezov of the Russian chart), lies 8 miles north-east of Observation island, and 7¼ miles off shore, the channel between being clear and safe. It is 476 feet high, and visible from a distance of 24 miles. Coming from the southward, it is an excellent land-mark when bound for Yung-hing bay. A shoal extends about half a cable from its south-west point.

Lon bay.—From Mian-tsin-liang point the coast trends in a north-west direction 16 miles to Codrika point. On the north side of the low isthmus which connects Mian-tsin-liang point with the mainland, is a small circular-shaped bay, into which a clear rivulet flows, and on the shore of which is the large village of Lon. The shores of the bay contain much basalt; the rocks off its northern point consisting almost exclusively of basalt columns. From Lon bay, northward, the coast is indented by small inlets with high points.

CODRIKA POINT, on which is a large village, is 326 feet high, and steep-to. At three-quarter of a mile N.W. ½ W. of the point is Basalt or Michaud islet, near which the depth is 6 to 8 fathoms. This islet has two remarkable grottos, the sides of which consist of perpendicular basalt columns about 40 feet high, in each of which boats can freely enter.

On the west side of Codrika point is a small bay sheltered from almost all except N.E. winds. The average soundings are 8 fathoms in the entrance, between the point and Basalt islet, and 11 fathoms in the bay. Two small rivulets flow to the west of a high point in the centre of the bay, and some isolated huts appear on their banks, forming together the village of Anbian.

YUNG-HING (BROUGHTON) BAY,[*] comprised between Ilary or Périer point to the south, and Desfossés point to the north, has an area of about 10 square miles. There are depths of 11 fathoms in the middle, and 7 or 8 fathoms at 2 or 3 cables from the shores of the bay, over good holding ground; but the best shelter will be found to the northward in port Lazaref, which is formed on the western side of Nakhimof peninsula, and has an area of 4 square miles. The entrance to Yung-hing bay is fronted by the following group of islands and rocks, which protect the anchorages on their western sides from easterly winds.

Nikolski, the largest and southern outer island of this group, is of oblong form and 3 miles in circumference. It is high, and covered with hills or mounds overgrown with cedars, and has a village on its western side; a small islet lies near its north point, and another at half a mile from its south extreme.

The French corvette *Capricieuse* anchored in 7 fathoms about one mile south-west of this island; but this outer anchorage is of little value, being 8 miles from the chief villages on the coast. The safest channel into the bay is between the south-west point of Nikolski and Ilary point; it is about 3 miles wide, and carries a depth of 8 to 10 fathoms.

Kuprianof island, lying 1¼ miles north of Nikolski, is somewhat smaller than the latter, also rounded and more desolate, forming, as it were, one sloping mountain. The channel between these two islands is apparently deep and safe, and convenient for vessels entering the bay.

Shin-tô or Annenkov island, at 3 miles west of Nikolski, is one mile long, east and west, and three-quarters of a mile wide. It consists of a series of hills crowned with cedars. The north side is steep and straight; the remaining shores though precipitous form little bays, at the head of one of which is a village.

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[*] *See* Admiralty plan:—Yung-Hing bay on sheet of plans No. 54; scale, *m* = 0·58 of an inch.

Shô-shin-tô and Tai-shin-tô, two small but high islands lie off the south-west face of Annenkov, and form with it a snug anchorage, carrying a depth of 10 fathoms. The channel between these islands and Muravief point to the south-west is three-quarters of a mile wide, and has 6 and 7 fathoms water in it; this point is the north extreme of a peninsula, which being connected with the main by low land, appears at a distance like an island.

Bô-tô or Vishnevski island, lying 2 miles north of Annenkov, is high and narrow, and about half a mile in extent N.E. and S.W. With the exception of its southern side, it is surrounded by a reef of sunken and dry rocks. Within the reef is another small islet or rock.

The channel between this island and Annenkov carries a depth of 16 fathoms in the middle, decreasing gradually on both sides to 10 fathoms, at a distance of one or two cables from the shore.

Zavalishin, Mitre, and Cone islands.—In addition to the foregoing chief islands of the group, there are several islets, which, with the exception of one, lie eastward of Vishnevski, between it and Kuprianof island. Of these, Cone islet is remarkable from its conical form; all the others are more or less alike, Zavalishin being the easternmost. There are several rocks above water surrounded by reefs, between these islets, that south-eastward of Zavalishin, extending three-quarters of a mile, terminates in a white rock above water, immediately south of which is a sunken rock. There are also rocks north of them, half-a-mile off the shore of the south face of Nakhimof peninsula, of which Desfossés point is the south-east extreme: some of these rocks from their whiteness are visible from a considerable distance.

These dangers would offer some difficulties if attempting the channel between the islets and Desfossés point. The channel is half a mile wide between this point and the most northerly white rock, but a sailing vessel might have baffling or light winds when passing the south end of the peninsula.

Gensan (Wönsan) situated on the south side of Yung-hing bay, was opened to Japanese trade in 1880, the harbour is easy of access, sheltered, and has depths of 6 to 7 fathoms, good holding ground. The town of Gensan is considered one of the great commercial centres of the Korea; it extends over a mile along the southern shore of the harbour, and in 1882 contained about 10,000 inhabitants. The country around is mountainous, thinly populated, and badly cultivated. The principal crops are rice, millet, beans, and jute.

The Japanese settlement is on the western side of the harbour, abreast Chôtoku-to (Changdökdo) island. The site is low and marshy, and it is unhealthy, especially in the spring and early summer.

PORT LAZAREF*(Virginie bay of the French charts), the entrance to which is in the northern part of Yung-hing bay, is formed on the west side of Nakhimof peninsula, which shelters it from the eastward. It is 2 miles wide at entrance; from thence trending about 6 miles in a northerly direction, and its breadth varies from 1¾ to 3½ miles, and carries a depth of 7 to 10 fathoms, over a mud bottom. The peninsula is covered with high hills, from the centre of which rises a sloping mountain with two sharp summits W. by N. and E. by S. of each other. It is connected with the mainland by a narrow sand spit, on which are several elevations having the appearance of islands, the western side being indented with small bays, on the shores of which are villages. Off the coast are several islands and rocks. A sand spit extends a quarter of a mile from Aliman point, the south-west extreme of Nakhimof peninsula.

In the northern part of the port are two islands, and in its north-west angle the mouth of Dun-gan river. Butenef, the westernmost and the largest of these islands, is 3½ miles in circumference, and its shores are steep except the eastern, from which a long spit extends in that direction. The best anchorages are at 1½ miles, and at 3 miles within the entrance.

From the inner anchorage towards the mouth of the river, the soundings gradually decrease to 7 fathoms; they then suddenly shoal to 5 and 3 fathoms to the banks which front the entrance. These banks approach very near the north-west end of Butenef island, and of Trifanof point to the south-west, leaving narrow channels between. The channel between the banks and the island is silted up at its northern part; that between the banks and the point leads into a wide though shallow bay.

This shallow bay extends westward 2 miles from Trifanof point. Its breadth at the entrance is about half a mile, becoming wider farther in. The shores are winding and varied in character, and there is an island at the north-west angle, and two islets in the middle of the bay. The whole of its northern part is occupied by a continuous reef, carrying only a few feet water which surrounds the two islets and extends to both the north and south shores of the bay. The bay is thus divided into two parts; one west, and the other east, of the meridian of the islets. The first or inner part is inaccessible from all sides; the other or outer part is connected with the north-west part of port Lazaref by the channel between the banks fronting the mouth of the river and Trifanof point, and may serve as an excellent shelter for small vessels during winter.

Dun-Gan (Eastern) river† falls into the north-west part of port Lazaref, and with its collateral branches, occupies the whole plain extending between two ranges of low hills. Winding along the plain, it approaches first one and then the other range which borders it. At its mouth, the river divides into several shallow channels, formed by a group of low marshy islands covered with villages. The breadth of the principal channel is about 3 cables, and the entrance to it is difficult, from its shallowness, and from its winding between the steep part of the banks before approaching the islands. The current of the river is weak, and the water for a considerable distance from its mouth is of a bad colour and taste. Large junks ascend the river.

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* *See* Admiralty plan :—Port Lazaref, on sheet No. 54; scale $m = 0{\cdot}58$ of an inch.

† River Aube of the French charts.

Admiral Guérin, who visited this port in the *Virginie* in 1855, states that the surrounding land is well cultivated and populous, particularly at the river's mouth. On the marshy island at the termination of the left bank there is a large village, apparently the commercial emporium of a considerable town in the interior, and which the natives said was the chief city of the province ; the information gathered from them only making the distance from Yung-hing to the city (which was thought to be Séoul,* the capital of Korea) 30 miles, and establishing the possibility of going there by water ; the river probably extends thus far.

The bar of the river had then 10 feet over it at low water, a depth which seemed to be the limit of the lowness of the river at this season (the height of summer), but in 1882 a depth of only 3 feet was found on the bars at low water.† From thence the course of the river was to the north, the soundings gradually deepening to 5 fathoms to the distance of 6 miles from its mouth, when it divided into several branches and appeared to run to the westward through a large plain terminating in a chain of high parallel mountains, covered with houses, hamlets, and villages.

Anchorage.—The outer anchorage is in 10 fathoms, mud bottom, in the middle of the port, the water shoaling gradually to both shores. The other or inner anchorage is in 8 fathoms (mud bottom), in the channel a mile wide between the south end of Butenef and the shore to the southward ; the latter is a convenient position for merchant vessels receiving cargo.

Supplies.—Fresh provisions, oxen, pigs, poultry, and vegetables, are plentiful both in Yung-hing bay and port Lazaref. Instead of procuring water from the Dun-gan river, it will be preferable to obtain it from the river Gifford, a clear and rapid stream in the south-west corner of the bay near the Japanese settlement of Gen-san. Wheat, millet, and tobacco are grown.

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* Séoul is about 115 miles from port Lazaref.

† Lieutenant A. Tate, H.M.S. *Vigilant.*

Tides.—The tidal streams are weak in Yung-hing bay; their influence being only felt in port Lazaref. It is high water, full and change, at 5h. 20m., and the rise is 2½ feet.

Directions.—The approach to Yung-hing bay and port Lazaref is not difficult. Besides the mountain with the sharp summits on Nakhimof peninsula, the proximity of the bay may be recognised by the islands fronting it. As before stated, the channel into the bay between the south end of the peninsula and the rocks and islets fronting it, is narrow and intricate and a sailing vessel might have light or baffling winds when passing Desfossés point.

The middle channel between the two outer large islands is apparently safe and convenient for vessels entering the bay. If entering by the southern channel between Nikolski island and Ilary point, and between Nikolski and Annenkov islands, do not stand towards the shore to less than 7 fathoms water. The channel between the two small islands Shô-shin-to and Tai-shin-to lying off the south-west face of Shin-tô (Annenkov) and Muravief point (the southern inner point of the bay), although narrow, is clear and deep. The only danger to avoid in entering port Lazaref is the reef extending from Aliman point, the east point of entrance.

The COAST, after passing Nakhimof peninsula, trends to the North and N.E., 54 miles to cape Rouge (cape Goncharof of the Russian charts). As far as Trompeuse or Losef point, which is the eastern extreme of a high headland in lat. 39° 35′ N., the shore is low and sandy, with several sloping hills rising at a short distance inland. Between this headland and Muséef point, 13 miles to the N. by E., the coast forms an extensive bay the shores of which are low and sandy, and the soundings regular, 8 and 9 fathoms, over a bottom of fine sand. A round hill rises near the parallel of the centre of the bay, and may serve as a good landmark for vessels entering, as it stands detached on a plain at a distance from the adjacent hills and mountains.

Hodo (Flowery) island situated in the centre of the above-mentioned bay is about 2 miles in circumference, with two islets off its eastern extreme, separated from it by a narrow rocky channel. The northern part of the island, as well as a portion of the western part, are sandy the remainder is rocky and high. The channel between its north-west end and the main is about a mile wide, but it is partly blocked up by a shoal which extends nearly half way across it from the island towards the main. The other part of the channel is probably shallow; large fishing boats were, however, seen to pass through it.

At 3 miles S.E. of Hodo are two small isolated rocks. Leaving the bay with an easterly wind, the *Pallas* had 9 fathoms between these rocks and the coast, but in attempting to pass between them and the island, the depth decreased to 6 fathoms, which compelled her to go south of them. A river disembogues in the northern part of the bay.

The COAST from Muséef point trends to the north-east towards cape Petit Thouars, is moderately high, indented by bays with cliffy shores and points, and bordered by scattered rocks and islands, the largest of which are, an island 3 miles in circumference, lying off the south side of Anjou point, and Goncharof island lying off cape Rouge. This latter has rocky shores, and is divided into two parts by a narrow creek, and forms with the coast a channel about half a mile wide, with an islet at its eastern end. This channel presents a good and apparently a safe harbour.

On the parallel of Muséef and Anjou points two high peaks show themselves inland.

Anjou point is perpendicular and high.

Cape Rouge, from its peculiar aspect, and having a high peak about 5 miles to the north-west of it, may be easily recognised. There are several villages hereabouts at the bottom of the creeks and bays, and traces of cultivation on the heights.

Shin-Po anchorage,* in the strait between cape Rouge island (Goncharof) and the mainland affords good shelter in about 10 fathoms, mud bottom. The strait is a mile wide at its eastern entrance and rather less at its western entrance, which is rather shallower than the eastern. On both sides of the strait are bays and inlets, those on the southern shore (cape Rouge island) being nearly a mile deep. The strait is quite clear of dangers, the depths varying from 6½ to 11 fathoms.

Weirich point, on which a village is situated, lies to the north-east of cape Rouge, and is a long narrow spit with three hills rising on it.

CAPE PETIT THOUARS (or Schwartz), seen from the south, makes in the form of a mamelon or small eminence, commanded by a conical but flat-topped hill a little west of it. The face of the cape is a large reddish cliff, 5 miles long, off which is a small pointed islet. To the W.N.W. of the cape, at 20 miles inland, the range of the Hienfung mountains, 8,114 feet high, is a conspicuous object. Between this cape and cape Rouge the soundings were 27 to 37 fathoms at 2 miles outside the points.

CAPE BRUAT (or Boltin) 60 miles farther to the north-east, is the eastern extreme of a chain of mountains, which presents two pointed summits 50 miles apart, the northern or mount Tao Kwang attains an elevation of 6,310 feet; the range slopes by a gradual declivity towards the east, where it terminates in a low cliff. Cape Bruat, 1,542 feet high, forms with cape Schlippenback, 27 miles to the south-west, a deep bay in which the soundings were 23 to 24 fathoms at above 2 miles off shore.

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* *See* Admiralty plan :—Shin Po anchorage on sheet No. 54; scale, $m = 1 \cdot 50$ inches.

COCKS COMB ROCKS.—The approach to the above bay is well marked by some jagged white rocks in the form of a cock's comb, lying 10 miles from the coast in lat. 40° 41¼′ N. There is also a group of three islets, named Arevief isles, connected together by shoals, in the northern part of this bay, in front of and at 1¾ miles from a projecting hill. The *Pallas* passed inside these islets, between them and the coast, and found the channel deep, 16 fathoms, and clear of shoals.

The COAST from cape Bruat turns abruptly to the northward and takes a N. by E. trend for 31 miles to cape Kozakof. For the first 10 miles it is inaccessible and perpendicular. The vegetation along its extent is very poor, not a tree or hovel being visible until near the cape, when villages again appear near the shore.

Cape Kozakof is a bluff rocky projection, about 2,615 feet high, and the limit of the high coast line; beyond it the coast turns to the N.W., and forms an extensive bay, 24 miles wide, north and south, and 6 miles deep, but open to the east. The depth was 40 fathoms in its northern part and no danger. Mount Stolovaya, a conspicuous object in this locality, rises 5 miles inland West of the cape. To the north of this elevation several detached hillocks and hills present themselves along the coast.

Kolokozev point, elevated 1,791 feet, and in lat. 41° 47′ 40″ N., is the north-east termination of a small bay formed between it and Urusof point to the south. From hence the coast curves to the north-east, assumes a more hilly appearance, and small islands and rocks lie off it. To the north-east of Bougarel or Linden point the shore is indented by a series of small bays as far as the large bay of Goshkevich.

Avvakum islets.—A group of high, rocky, and desolate islets, lie 7 miles N.E. of Bougarel point, and near the shore. The group consists of two large islets, about the same size, with some smaller ones; the soundings were 20 to 26 fathoms near them.

GOSHKEVICH BAY* is formed between a steep point to the north-east of the Avvakum group and Sisuro point or cape Casy, the south extreme of the Sisuro peninsula. In some of its nooks it has convenient anchoring ground protected nearly on all sides. A round island, rather remarkable for the regularity of its form, and a smaller one near it, lie at the head of the bay.

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* *See* Admiralty chart:—Tumen Ula to Strelok Bay, No. 2,432; scale, *m* = 0·25 of an inch.

The northern shores of the bay are sloping, and the bay is connected to the north-east with a deep basin. This connexion is not visible from seaward. The basin was accidentally discovered during the survey of the shores of the Tumen river, and was not examined.

Belaya Skala, an island with white cliffs, and surrounded by rocks, lies in the middle of the entrance, at 3 miles S.W. of Sisuro point.

SISURO POINT.—Sisuro peninsula, the south-eastern extremity of this bay, is connected with the mainland by a very narrow isthmus; its sides, with the exception of the one facing the isthmus, are rocky. Sisuro village stands on the east side of the peninsula, on the shores of a small bay convenient of access for fishing boats; the village is large and surrounded by low stone walls. This small bay is formed by the peninsula and a small promontory, which, with the inconsiderable precipitous mountains to the north-east, are the principal landmarks for the mouth o the Tumen, without which there would be difficulty in finding it on the sandy coast. The limit of muddy water extends too far off shore to serve as a guide to the position of the river's mouth.

M. Rocquemaurel, captain of the French corvette *Capricieuse*, in his report says, "Sisuro point is only 153 feet high. At 10 or 12 miles off it resembles a large rock scarped and jagged like the profile of a Venetian fort. Completely isolated from the mountains which rise above it to the north, it appears severed from the shore, to which it is joined by a long low beach trending N.N.E. About 18 miles inland to the west, mount Chienlong, rising 4,215 feet above the sea level, appears to form the north-eastern range of heights extending some 30 miles to the south-west, at about 10 miles inland."

"To the eastward of the river the range of mountains suddenly change their direction to the north-west, leaving a large valley between them. The remarkable structure of the ground consists generally in beds of gneiss or schist thrown up so to form cliffs or pointed hills, which rise abruptly from a low swampy shore; everything bears the stamp of a complete change in soil, climate, and people."

The TUMEN* or TSING-HING RIVER, separates the Korea from the vast territory occupied by the Manchu Tartars; and by the Russo-Chinese treaty of 14th November 1860, it now forms the southern limit of the Russian territory on the shores of the sea of Japan. Its embouchure opens in the middle of a low plain, 4½ miles eastward of Sisuro point, in lat. 42° 19′ N., long. 130° 41½′ E.

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* *See* Admiralty plan:—Tumen Ula, on sheet of plans No. 2,407; scale, *m* = 2·0 inches.

This river, which was examined for the first 10 miles from its entrance by the boats of the *Pallas* in 1854, not only serves as the northern boundary of the Korea, but is the limit of the mountainous coast line. It is bounded on the west from its fall to the sea, a distance of 10 miles, by a high projection of the coast, on the west side of which is Goshkevich bay, and by a sloping depression of the land on the east.

From seaward the entrance is only observable on account of the elevation of its right bank. A long sand-spit, extending from the left bank, narrows the entrance, and forms a bar carrying 9 feet water. The channel is winding, the soundings irregular, from 3 to 1 fathoms, and even less, and it runs between numerous shoals and banks, several of which appear above water in the form of low islands. This renders the navigation difficult, and higher up from its mouth the river becomes so shallow as to be fordable.

The right bank of the Tumen is hilly, and terminates in steep sandy slopes; the left bank presents an extensive plain, covered with lakes, or rather marshes, filled with brackish water. The banks preserve this character for the 10 miles examined. As regards its course higher up, no positive information could be procured from the Koreans, who are in general taciturn.

POSIETTE BAY* (D'Anville Gulf of the French charts) is comprised between Sisuro point to the south, and cape Gamova to the north, about 33 miles apart; and is the southern post of the Russian possessions in the Gulf of Tartary.

Cape Gamova, rising 1,800 feet above the sea, is the end of a peninsula extending to the south, and is formed by a conical mountain sloping gently to the north, where, as in the south, it terminates in steep cliffs. It is visible 30 miles off, and coming from the north-east is a good landmark for this bay, as Sisuro point is from the south.

To the north-west the bay contracts forming a strait 4 miles in length and about 2½ miles wide (known as Pallada road) contracting at its north-west extreme to a narrow passage half a mile in width, but the navigable channel of which is further lessened by Tcherkarsky island and shoal banks, leaving only a channel of a little over a cable in width communicating with three larger natural basins named Pallada road, Novgorod harbour, and Expedition bay, completely land-locked and affording perfect shelter to any number of vessels. It is said never to be frozen over, though Vladivostock, only 70 miles distant, is so for three months in the year. The shores of Posiette bay are mountainous and covered with grass, the south-west shore of the bay being the highest.

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* *See* Admiralty chart:—Tumen Ula to Strelok bay, including Peter the Great bay and Posiette bay, No. 2,432; scale, $m = 0 \cdot 25$ of an inch.

The land at the bottom of the bay is low, marshy, and broken by a range of steep bluffs, resembling at a short distance a group of islands.

Furugelma island, lying in the south-west part of Posiette bay, is 3 miles in circumference and 413 feet high. It forms a good mark for entering the bay, when distinguishable from the high lands to the north-west, with which it is generally blended when approaching from the southward. There are two villages on its west face.

A reef of rocks extends more than half a mile from its south-west point.

Balleine rocks, another reef (only 8 feet above water) projects fully one mile from its north-west point.

The channel between the island and the coast is 3½ miles wide, and carries a depth of 12 fathoms, but care must be taken to avoid Balleine rock.

Pilier and Buoy rocks.—At half and two-thirds of a mile N.N.E. ¼ E. and E. by N. ¾ N. respectively from the north-eastern point of Furugelma, lie the Pilier and Buoy rocks; the Pilier is about 30 feet in height, and is steep-to with 16 to 23 fathoms around; but the latter rock hardly shows at high water.

Cape Boutakov (Charbonier point), the southern point of Kalavala bay, is high and steep.

KALAVALA (MOULE) BAY between cape Boutakov and Souslov point is partly sheltered to the south-east by Furugelma island, and to the north-east by Bodisko peninsula. The bay is 1¾ miles deep north and south, and one mile wide at entrance, which is narrowed by a reef of rocks, awash, stretching nearly 2 cables off the west shore.

The depth, 8 fathoms, at the entrance of this bay, decreases gradually up to the sandy beach, near which there is a depth of 16 feet. The holding ground is not good, being composed of fine sand and gravel with but little clay. The bay is open from S.S.E. to E.S.E., but the force of the sea from the latter direction is expended on Patau point, the south-east end of the peninsula. With the wind from S.E. to S.S.E. a heavy swell sets in, and makes the anchorage unsafe. The highest tides observed rose about 3½ feet.

Souslov point (Bodiska peninsula) is high and steep, and the summit named mount Direction is 820 feet high: the peninsula is joined to the coast by a low isthmus, having on it a village.

Klikova or Yedo rock lies in mid-channel at entrance to Pallada road, with Ostrano point (Malte Brun) bearing West distant 3¼ miles; the middle of Furugelma island bearing South, and cape Gamova E. ½ S. The rock is of triangular shape with only 10 feet water on its shoalest part, and is steep-to on all sides; but it can be readily distinguished by the white seaweed which covers it.

PALLADA ROAD,* comprised between Souslov point to the south, and cape Deger (Klaproth point) to the north, is 5 miles deep N.W. and S.E., with a mean width of 3 miles. It affords fair anchorage within Balbi and Ostrano points, the inner points of the bay, in 12 to 5 fathoms, mud. The best berth is in 7 fathoms, mud, upward of a mile south of Porsic point; but as this anchorage is open to S.E. winds which throw in a heavy swell, it can only be considered as a temporary anchorage for vessels waiting to pass into Expedition bay or Nov-gorod harbour at its head.

Directions.—Entering Pallada road it will be necessary either to sight Sisuro point or cape Gamova, to make sure of the position; sighting Furugelma island must not be depended on, for it is often blended with the high lands to the north-west; and great care must be taken to avoid the Yedo rock lying in mid-entrance.

If working up against north-west winds, which are often fresh, a vessel should, when standing to the south-west towards the Pilier and Buoy rocks, go about when Ostrano and Bergasse points come in line bearing N.W. ¼ N.; the latter rock, as before-mentioned, is nearly covered at high water.

EXPEDITION BAY† is a good and secure harbour, and affords a safe retreat for vessels not wishing to ride out a south-easterly gale in Pallada road. The entrance lies between Tchurkhoda, which is the northern termination of the sandy spit at the head of Pallada road, and Porsic point, the west extreme of Krabbeh peninsula; it is nearly half a mile wide, but is divided into two channels by a large bare rock named Tcherkarsky island (Mingan rock) 300 feet high, which appears white, from its being covered with guano. The eastern of these channels should on no account be taken, as the ground is rocky and uneven, with a depth of only 4½ fathoms in its centre. The other channel on the west side of Tcherkarsky must be entered with caution, for it is narrow, and a shoal extends nearly half way across from Tchurkhoda, so that it is advisable rather to close the former, as it is almost steep-to on its western side.

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* *See* Admiralty plan:—Pallada road, on chart No. 2,432; scale, $m = 1 \cdot 3$ inches.

† *See* Admiralty plan:—Expedition bay, on chart No. 2,432; scale, $m = 1 \cdot 3$ inches.

Entering the bay, take care to avoid a small knoll of 3½ fathoms water with 5 or 6 fathoms close to, which can be done by borrowing on the northern side of the fairway, as the knoll is directly or very nearly in the centre.

The observation spot on Tchurkhoda rock is in lat. 42° 38′ 0″ N., long. 130° 48′ 45″ E. (*approx.*).*

Oyster bank.—Nearly one mile N. by W. from Tyrol point (Moukhouvey peninsula) is a bed of oysters with only one fathom water on it. Others are reported as existing in the neighbourhood.

Coal is obtained from coal-pits situated on Mokhouvey peninsula about 3 cables north-east of Tyrol point. Vessels can anchor off the coal pits in 18 feet water, mud bottom, at 2½ cables from the shore.

Water can be procured from the Chinghing river on the south shore of Expedition bay, near the village of Khantchi, but only small boats can go in, except at high tide.

Tides.— It is high water, full and change, at the entrance to Expedition bay, at 2h. 30m., and the rise is about 2½ feet. The streams are not felt except in the narrows. In the narrow strait between Pallada road and Expedition bay the rate is sometimes 2 knots an hour.

NOV-GOROD BAY.†—After passing through the channel between Tchurkhoda and Tcherkarsky rocks, Nov-gorod bay will open out to the eastward. When cape Ryzanova has been made out the north shore should be approached to avoid a shoal bank which extends 2 to 3 cables from the southern shore (Krabbeh peninsula). Anchorage may be taken anywhere in mid-channel, either abreast the small bay where the settlement is, or further eastward, with good holding ground, mud and sand, the anchorage being completely land-locked. There is a small Russian settlement, which consists merely of a few wooden huts capable of holding two or three companies of soldiers situated on Mokhouvey peninsula, about 60 feet above the sea, with telegraphic communication with the other Russian posts on the coast. There is also a Russian encampment 1½ miles inland from Pai Satchiza, on the north shore of Expedition bay. There are several villages on the shores of the harbour, but the houses are very poorly built, the natives being Manchu Tartars who live principally by fishing. The soil is rich, and maize, sweet potatoes, cucumber, and poppy are cultivated, but there are no large trees near the coast.

A hard sandy spit extends across the upper part of the harbour, where several fine bullocks and horses were observed to cross at low water.

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* *See* Admiralty Chart, Tumen Ula to Strelok bay, No. 2,432.

† *See* Admiralty plan :—Nov-gorod bay on chart No. 2,432 ; scale, *m* = 1·3 inches.

Above this spit is a large lagoon, about 2½ miles across each way, with irregular soundings in it, from 2½ fathoms to 4 feet. The harbour abounds with fish.

Supplies.—There are several small runs of good water, which are marked on the plan of the harbour, and one spring, from which about 10 tons per day might be collected, all close to the shore. There are also various beds of oysters (some near the settlement), and one of large mussels. The low undulating hills are covered with long grass, and abound with pheasants, partridges, and foxes; and the low ground, which is swampy, with woodcock and snipe. Fowls are very scarce.

The only exports are seaweed, skins, and sea slugs, which are sent to Chefoo. The bay is frozen over for 3 months in the year (December to March). There is telegraphic communication with the other Russian ports on the coast, and with Japan.

PETER THE GREAT BAY.—Eastward of cape Gamova the coast forms a deep bight 50 miles across, between it and Askold island, divided—by a peninsula, which projects southward from its head, and a chain of numerous islands—into two deep bays, the western of which is named Amur bay, and the eastern Ousouri bay.

Korsakov island (Peeles), about 2½ miles in length, and of irregular outline, lies about 11 miles west-north-west from cape Gamova, the channel between having depths of from 25 to 30 fathoms in it. From the island a chain of islets and rocks extend in a north-west direction nearly 3 miles. Off the south-east point of the island are several high rocks, resembling the Five Finger islands off the south part of Putiatim island. Approaching from the southward it appears as two islands.

Dournovo, Hildebrandt, and Dalevron, a group of small islands, of which the latter is the largest, and all of about the same height (100 feet), lie from 2½ to 3½ miles north-west from Korsakov; they are steep and covered with brushwood.

Rocks.—Two rocks, awash, lie one mile north-west of Dalevron island.

Styx bay.—To the north-west of these rocks is a bay in which the *Styx* anchored in 8 fathoms sandy bottom, but it only affords shelter in northerly and westerly winds.

Manjur or White Cliff bay.—A large open bay immediately north of Styx bay, apparently affords good shelter, but there was no opportunity of examining it. The south point, with rocks off it, should not be approached too near, as irregular soundings were obtained in its vicinity.

Redcliffe island, lies about 3 miles north-east of Korsakov island. A reef with only 1½ fathoms on it is said to lie about 4 cables N.W. from the north point of Redcliffe island; and there is also a rock off its south-east point. A reef extends one cable from its N.E. point.

Antipanko and Sebereakov islands, 4 miles southward of Slavianski bay, are connected by a reef, west of which is a high, isolated rock, of a dark colour, resembling a column. Both islands are high, rocky, covered with vegetation, and steep-to.

AMUR BAY is 35 miles long in a north-east direction, with an average breadth of 6 miles; there are depths of 30 fathoms in the entrance between Antipanko and Tsivolko islands, decreasing gradually to 3 fathoms at the head of the bay.

SLAVIANSKI BAY (Port Bruce), situated 3 miles northward of Antipanko islands forms in two bights, that to the north-west being an excellent harbour. The bay is well protected by the Eugénie archipelago, which fronts it, and forms a good breakwater in south-easterly winds. There is no difficulty in working in, there being 4½ fathoms about a quarter of a mile from Bruce point, the south point of entrance, and 10 fathoms near the islands on its northern side. The soundings are regular, and a vessel may anchor in 4 fathoms, good holding ground, near the head of the north-west bay, where there is a small river. There is, however, said to be a heavy swell in this part of the bay, with winds from East and S.E., so that with winds from that quarter the south-west shore of the bay would probably afford the best anchorage.

Supplies.—Fish and potatoes were procured from the natives, and they appear to be amply provided with those necessaries.

Gerasineov island, covered with trees and about three-quarters of a mile long (north and south), lies at the entrance to the bay, nearer its northern shore. Vessels entering should pass south of it.

The COAST, northward of Slavianski bay, forms two bays at its southern end, and thence trends nearly straight to Leitke point, this latter part being high, but as it has not been closely examined vessels should approach it with caution.

Kauprianov point is the southern point of the first bay, northward of Slavianski bay, in which the river Sedimi enters the sea. This bay is apparently deep.

PESTCHANOI POINT (Sandy point).—When abreast Slavianski bay, mount Virginie, a high table hill will be seen to the north-eastward with a tuft of trees on its summit, and farther in the same direction another named mount Winchester, a rocky and elevated promontory, the eastern slope of which terminates in a low sandy point (Pestchanoi) in lat. 43° 11′ N.

Peschani bay.—The *Winchester* anchored in 6½ fathoms, mud, with this point bearing S. by W. ½ W.; Retchnoi islet N.N.E. ½ E.; Skrebtsoff islet E. ⅓ S., and Aube bluff, E. by N. ¼ N.; this anchorage is good and quite land-locked. A provision depôt is established in this bay for the use of the Russian troops stationed on the Sui-fun river.

The north-east shore of Amur bay (west side of Muravief promontory) is moderately high and well wooded, and quantities of timber are cut and shipped from the neighbourhood.

Sui-fun river.—The head of Amur bay forms an extensive bight, in which for 3 miles from the shore the water is shoal, the Sui-fun, a river of some magnitude flowing into the bay at its north-west extremity. The Sui-fun enters the bay by several channels, only one of which, near Retchnoi island, is passable for boats. Beacons mark the channel into the river.* There is a Russian military post on the river and at Chankow lake; and near the Sui-fun are Government saw mills entirely employed in preparing timber for the Russian settlement at Vladivostok.

The distance from Pestchanoi point to the entrance of the river is 7 miles. A vessel might anchor within 3 miles of the entrance, as the depths gradually shoal towards it.

Water.—Good water can be procured about a mile from the entrance to the Sui-fun river; but the same difficulty would be experienced in watering as at the one already alluded to in Expedition bay.

Aube bluff (Sacha Zuisa), the eastern point at the head of the Amur bay, is composed of sandstone with a layer of lignite exposed to view on its sea face.

Retchnoi island, about a mile off the shore of the mainland at the head of the bay, and 2½ miles S.S.E. from the entrances to the Sui-fun river, is a bare rock 70 feet in height.

Wood can be obtained on any part of the coast, the land being covered with trees and the beach with drift-wood.

EUGÉNIE ARCHIPELAGO consists of a chain of islands extending in a south-west direction from Murivief Amursky peninsula for a distance of 20 miles.

KAZAKAVITCH ISLAND, the largest of the chain and the nearest to the Muravief promontory—from which it is separated by the strait known as the Eastern Bosphorus—is about 8 miles long, and the same in width, deeply indented in many parts, and consequently of very irregular outline; the deepest indentation (Novik bay) nearly separating the island into two parts. It is mountainous and thickly wooded.

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* The beacons in line lead in deepest water (said to be 3 feet at low water). Coal has been found on the high wooded shore south-westward of the Sui-fun river, but it is said to be of inferior quality.

Novik bay,[*] the entrance to which is on the north-west side of Kazakavitch island, is a long and narrow inlet, extending in a south-west direction for a distance of 6½ miles, nearly to the south-east point of the island. Novik bay is 8½ cables wide at its entrance, gradually narrowing towards its head, and is very clear of dangers, having a depth of 9 fathoms between the entrance points, and depths of from 8 to 5 fathoms to within a mile of its head, where it suddenly shoals. The shores are everywhere steep and mountainous and covered with thick wood, especially on the south shore. The bay is sheltered from fog by the high range of hills (780 feet), and the climate is said to be in consequence better than that of Vladivostok or Possiette bay. The country round abounds in snakes.

Paris bay, on the north-east of Kazakavitch island, immediately westward of Skrypleff island, and on the south side of the Eastern Bosphorus, affords sheltered anchorage in 9 fathoms. Shoal water extends 3 cables north-west of Titkoff, its eastern entrance point.

Ajax bay—Skriabin bank.—Ajax bay, immediately north of Paris bay, is open to the eastward, and has several shoal patches in it, the shoalest of which is Skriabin bank, lying about midway between capes Balka and Novosilsky.

A floating beacon, surmounted by a double broom, is moored eastward of the shoal extending from cape Novosilsky.

Voevoda and Boyarin bays,[†] on the west coast of Kazakavitch island, also afford shelter for ships of the largest draught, and no doubt good water can be procured at these, as well at every other part of this coast, by digging wells; but no running streams of any size were seen.

Nor-saha point, on the south-east side of the island, has a reef extending from it for about 1½ cables in a south-east direction.

Hulrai bay, situated westward of Nor-saha point, becomes foul towards its head, where are numerous rocks on which seals are frequently seen.

Popov, Reineke, and Rickord, the next largest islands of the Eugénie archipelago, lie to the south-west of Kazakavitch, the former being only separated from this island by a narrow and shoal channel. Rickord island, about 2½ miles long (N.E. and S.W.) and a little over half a mile wide, lies nearly 2 miles south-west from Reineke island, leaving a clear passage (Japanese strait or Fellowes passage) between, with depths of 8 to 15 fathoms in it. The islands are high and mountainous, the two first named being covered with wood.

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[*] *See* Admiralty plan:—Novik bay, on sheet No. 2,407; scale, *m* = 3½ inches. The islands of this archipelago are reported to be inaccurately laid down on the charts. Caution is therefore necessary when navigating in this locality.

[†] *See* Admiralty plan:—Anchorages on the west coast of Kazakavitch island, on sheet No. 2,432; scale, *m* = 2 inches.

Virkhovski islands lie nearly 3 miles south-east of Reineke, on the north side of Japanese strait; they are low, and the south-eastern island is marked by a beacon (pole and cage).

Karamzin island lies 1½ miles south-east of Rickord island; it is steep-to all round. Four other islands lie within a distance of 2½ miles south-west of Rickord island, the outer of which is Jeltukhin island.

Tsivolko island, 1½ miles W.N.W. from Jeltukhin, is a small round island conspicuously green; it is marked by a beacon, and has a remarkable hole through it.

JAPANESE STRAIT and CURRIE CHANNEL are two excellent outlets through the archipelago into Peter the Great bay; the former, between Reineke and Rickord islands, is nearly 2 miles wide; the latter, between Jeltukhin and Tsivolko on the north-east and Sebereakov and Antipanko islands on the west, is 6 miles in width.

EASTERN BOSPHORUS (HAMELIN) STRAIT,* between the south end of Muravief Amursky peninsula and the islands forming the Eugénie archipelago, is 6 miles long, and about half a mile broad in its narrowest part. At its western entrance is a sand spit stretching nearly half-way across the passage from the northern point, cape Tokarefsky; the spit is steep-to, having 28 fathoms water within a ship's length of it. When past the spit there is no danger, and a vessel may run or work through, by paying attention to the lead. The tidal stream flows through at the rate of 2 knots an hour. The shores of the strait are but thinly populated.

Buoy.—A buoy, coloured red and white, in vertical stripes, lies off the extremity of the spit extending south-south-east from cape Tokarefski.

Skrypleff island, about one-quarter of a mile long and the same in breadth, lies at the eastern entrance to the Eastern Bosphorus, about 1½ miles S. ½ E. from cape Basarghim and 9 cables eastward of cape Jitkoff, the southern entrance point. It is a round rock covered with grass, about 150 feet high, steep-to all round, and hardly accessible.

Beacons.—Two beacons, in the form of a cross painted white, are erected on the east side of Skrypleff island. These beacons in line, bearing S.S.E., lead over the centre of the reef which extends in a north-west direction from Skrypleff island. Vessels, therefore, approaching from the northward should keep the beacons open of each other. The north point of the reef is marked by a buoy.

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* *See* Admiralty plan:—Eastern Bosphorus strait, on sheet of plans, No. 2,407; scale, *m* = 3·5 inches.

Reef.—A sunken rock is reported to lie 7½ cables N.W. ½ N. from the north point of the island.

LIGHT.—From a lighthouse, about 18 feet high, situated on the south point of Skrypleff island, eastern entrance of Eastern Bosphorus, at an elevation of about 150 feet above the sea, is exhibited a fixed white light, visible in clear weather from a distance of 15 miles.

Fog Signal.—A bell placed near the lighthouse will be sounded during thick weather, fogs, or snow-storms; and a gun will be fired from the east end of the island in answer to reports of guns heard from seaward, during the same weather.

Buoy.—A buoy, coloured red and white horizontal stripes, marks the extremity of the shoal which extends 2½ cables from cape Jitkoff in an easterly direction towards the south end of Skrypleff island.

PORT VLADIVOSTOK*—(Golden Horn bay, or port May), on the northern side of the Eastern Bosphorus, is an excellent harbour, where a vessel may lie quite land-locked in 8 or 9 fathoms, mud bottom. Vladivostok is 70 miles from Posiette bay, and for the greater part of the distance there is an inner channel, which leads inside the Eugénie archipelago and forms a sheltered inland sea for vessels and boats trading between the numerous bays along this part of the coast. The land about Vladivostok is high, and for the most part thickly wooded, except on the north shore, where the Russian settlement stands. The town in 1881 contained 800 houses, 23 being of stone, and it is fast rising in importance, now that it is the head-quarters of the Russian squadron in Siberian waters. At the western end is a naval yard consisting of a small steam factory sufficient to repair ships, engines, or boilers, a building slip for small vessels, and when the plant of machinery is transferred from Nikolaevsk (on the Amur), the former principal port in Russian Tartary, Vladivostok will no doubt become an important naval station, especially so from its position with regard to Japan, the Corea, and China. The houses, which are scattered over the whole of the north shore, are of wood white-washed, the principal buildings being the Government and Admiralty houses. There is also an observatory; and there are schools and a Greek church, besides a few good shops containing requirements of every description. At the eastern end are the barracks and huts of the soldiers and seamen.

There is not much cultivation in the neighbourhood, although the soil appears fertile; and the country was cleared (in 1875) only about 2½ miles round the town, and in the thick forests beyond, tigers, bears, wolves, boars, and deer abound. The shores are covered with oak forests. Coal appears to be everywhere present, and an attempt has been made to work it. The north and west shores are mountainous, but low near the sea; the eastern shore is low and marshy, and a small river here enters the port. The south shore is hilly, and the hills over the settlement are entrenched.

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* *See* Admiralty plan:—Port Vladivostok on sheet No. 2,407; scale, *m* = 3·5 inches.

The climate though variable during summer is pleasant, but it is cold and dreary in winter. Early in August the thermometer ranged from 64° to 70° with cloudy sky and occasional heavy rains. May to July are usually wet months. From August to November it is fine and dry, especially September and October. The place is said to be healthy, though the winter temperature falls it is said to 10° Fahr. From about the 21st December to 15th April the Golden Horn and sometimes the Eastern Bosphorus is frozen in, and though there is no snow the ice is firm enough to allow sleighing in every part. The harbour, however, is but rarely frozen to interrupt communication for more than three or four months in the year, though there sometimes occurs an exceptionally severe winter.* From May to August fogs are said to recur every four days.

Vladivostok exports ginseng, sea-kale, deers' horns, dried fish, trepang, crabs, and lobsters for the Chinese market, and imports spirits, oil, candles, groceries, and manufactured goods of every description, the value of the former amounting in 1881 to 220,149 roubles, and the latter to 3,175,199 roubles. In 1881 there were 65 vessels entered the port exclusive of native craft.

The population in 1881 was classed as follows:—Russian subjects including troops 5,883; foreigners of all nations 1,936. The aborigines of this coast are called Tazzas and do not number more than 5,000 along the whole littoral. They are simple people, fond of beads and ornaments, wandering from place to place and subsisting on hunting and fishing.

Anchorage.—Vessels may lie at anchor anywhere in the Golden Horn, but the eastern end is generally preferred; the bottom, stiff mud, is excellent holding ground.

Docks.—Dock works were in 1883 being rapidly proceeded with; and an hydraulic lift (which can be used either as one or three docks) capable of lifting vessels of 4,500 tons, is in course of construction.

Supplies.—Fresh beef can be obtained at 6*d.* per lb., and quantities of all sorts of vegetables. Salmon can be procured in abundance. Ponies are numerous, and bears and tigers are frequently encountered, in winter closely surrounding the settlement. Deer abound. Water can be obtained from wells but there is a scanty supply; it must be brought off in the ship's boats. Vladivostok is connected by telegraph with St. Petersburgh and with Japan. Coal (Dui and Taka sima) can be procured in any quantity.

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* In 1878 the winter commenced in October, and was the severest known for many years, the harbour being entirely covered with ice from 2 to 3 feet thick.

LIGHTS.—On cape Goldobin, eastern entrance point of port Vladivostok, is exhibited from two *red* posts, two lights. The upper elevated 45 feet above the ground and 53 feet above the level of the sea, is a *fixed red* light and should be visible in clear weather from a distance of 8 miles. The lower, elevated 44 feet above the ground and 48 feet above the sea is a *fixed white* light, and should be visible (in clear weather) from a distance of 7½ miles. A watch-house with yellow walls and red roof stands near the lights, and there is also a battery on the cape.

Also on the seaward extremity of the Admiralty pier is exhibited two *fixed* lights, the eastern *red*, and the western *green*; and from the inner exremity of the pier two *fixed white* lights.

Fog signals.—During thick or foggy weather a large bell will be sounded in slow succession. In answer to signals from seaward a large and small bell will be sounded in quick succession.

Signal stations.—There is a signal station on Skrypleff island, and on cape Goldobin in communication with the telegraph station at Vladivostok.

Buoys.—At about 1¾ cables north-west from cape Goldobin is a buoy, coloured black and white in horizontal bands, marking the shoal bank which extends along the western shore of the cape.

At the same distance south of Egerschéld point is a buoy coloured red and white in vertical bands, marking the shoal water extending southward of that point.

A black and white buoy is moored in 3 fathoms on the edge of the bank, 1¼ cables north of Churkiu point.

A white buoy is also moored in 5 fathoms, half a cable north from cape Menschuk.

Patroclus bay, on the northern shore of the Eastern Bosphorus, affords anchorage in its north-east corner in 6 fathoms, fairly sheltered.

Ulysses cove is a landlocked basin about half a mile wide lying westward of Patroclus bay. Its narrow entrance is only half a cable wide.

Diomedes inlet, immediately east of cape Goldobin, is nearly three-quarters of a mile deep, and affords secure and sheltered anchorage.

OUSOURI BAY is about 33 miles deep and 16 miles wide, abreast Eastern Bosphorus, and the land everywhere on its western shore is bold and resembles that of Amur bay.

The eastern shore of Ousouri bay has several indentations, all of which, with the exception of Kangouza bay in its northern part, are encumbered with shoals.

Two large rivers (the Kangouza and Shidago) flow into this bay, and there are some Manchu inhabitants.

ASKOLD ISLAND[*] (Termination island), off the eastern shore of Peter the Great bay, is 2,000 feet in height, about 3½ miles long, and 2½ miles broad. Rocks extend off its north-east and south-east points, and its shores are steep and rocky. Gold is reported to have been found here.

LIGHT.—From a lighthouse painted red, situated on the south point of Askold island, is exhibited a *flashing* white light of the first order, visible from seaward between the bearings of S.E. ½ E. and W. by S. ¾ S. It should be seen in clear weather from a distance of 25 miles.

Fog signal.—During thick or foggy weather, a bell will be sounded; and in answer to every gun heard in the offing a gun will be fired.

Nayezdnik bay,[†] on its south side, affords anchorage at its head in 8 fathoms, but the anchorage is open to south-west winds.

Between Askold island and Maidel point (on the mainland) is a passage 3 miles wide, the least depth in which is 16 fathoms.

Unkofski island, a bare island, about 80 feet high, and having some small islets off its north end, lies in mid-channel between Maidel point and Askold island.

STRELOK BAY.—Port Freeman.—Westward of Maidel point the coast forms a bight, the centre of which is filled by the large island Putiatin, thus forming a strait in which on the north side are several small bays. The whole of this bight is named Strelok bay.

Putiatin island, is not less than 1,000 feet in height at its northern part, is 7 miles long (north and south) and of very irregular width, being about 3 miles across its middle, and about one mile wide at its north end; the southern end stretching to the south-east in a narrow, low, peninsula only about half a mile wide. Off the south end are the Iretski and Piat Paltsev islands.

Rasboinik bay,[‡] at the north-west corner of Strelok bay, affords excellent anchorage in the inner bay for one vessel in 5½ fathoms, completely landlocked; and other vessels may anchor outside in perfect shelter.

Abrek bay, in the northern part of Strelok bay, just eastward of Rasboinik bay, is exposed to winds from the south-east, which send in a heavy swell directly up the eastern entrance.

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[*] *See* Admiralty chart:—Strelok bay to St. Vladimir bay, No. 2,511; scale, *m* = 0·25 of an inch.

[†] *See* Admiralty plan:—Nayezdnik bay, on chart No. 2,432; scale, *m* = 1·75 inches.

[‡] *See* Admiralty plan:—Rasboinik bay, on chart No. 2,432; scale, *m* = 5·0 inches.

VOSTOK BAY, a deep indentation of the coast immediately east of Strelok bay is open to winds from the south-west, but small bays on its northern shore afford sheltered anchorage. The coast between Strelok bay and Vostok bay is high, steep, and rocky; and the shores of the bay are uninhabited.

Gaidamak harbour,[*] on the western shore of Vostok bay, although small, affords secure and sheltered anchorage in 5 fathoms. There is an inner harbour or basin in which is a depth of 4 fathoms, but the entrance is only about 50 yards wide.

AMERICA BAY (Hornet bay) is formed between cape Sredni, on the west, and Povorotny point on the east, and Captain Forsyth, who discovered it in H.M.S. *Hornet* in 1856, describes it as a spacious inlet, in about long. 133° E., carrying a moderate depth of from 25 fathoms at the entrance to 5 fathoms up to its head, but open to southerly winds; the bay is 8 miles wide at its entrance, and about the same distance deep. Approaching America bay from the eastward, two peaked summits on Lisuchenko point are conspicuous landmarks, appearing as asses' ears.

Sutchan river.—The Sutchan, a river apparently of some magnitude, flows round the foot of a peculiar conical hill at the head of the bay; it is probably navigable for some distance; there is a depth of 5 feet on the bar.[†]

Lisi (Fox) island, is a small island on the west shore of America bay. Vessels should not pass between Lisi island and the mainland, as sunken rocks are found off the west shores of the island; but there is good anchorage northward of it between the island and the main. Many villagers and several herds of cattle were seen. The country is thickly populated, and the natives freely bartered their vegetables for old clothes, bottles, &c.

POVOROTNY POINT (CAPE KRUILOV), the south-east point of America bay, has a steep face, of gray rock 200 feet high, much cut up, and presenting a very rough appearance. Southward of Povorotny point, is a red cliff, showing horizontal strata, and some distance north-east of the point is a hill with a caplike summit, of red, horizontal, stratified rock, the cliffs between being dotted with sandy patches.

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[*] *See* Admiralty plan :— Gaidamak harbour on chart No. 2,407; scale, *m* = 10·0 inches.

[†] There is a Russian convict settlement (Alexandroviska) of some size, on the Sutchan river. The entrance to the river, over a bar, is small, with a depth of 12 feet in the channel; inside the bar there is plenty of room. Gold is reported to have been found here.

WRANGEL BAY,* a small bight on the eastern shore of America bay, indents the coast in a S.E. direction, is 8 cables wide at its entrance, and about 2 miles deep, affording good anchorage, perfectly sheltered from all winds. There are a few Tartar huts, the inhabitants of which subsist chiefly by fishing; they also cultivate the opium poppy to a small extent. Two small rivers, the Tiakangoi and Siakangoi, flow into the bay, but both have sand bars at their entrances. The hills, which are not high, and the country all round is covered with thick scrub, very difficult to penetrate, and the long grass affords excellent cover for game. The depths in the bay decrease gradually from 10 fathoms at the entrance to 6 fathoms at half a mile from the beach at its head. The tide rises 2 feet in Wrangel bay.

NAKHODKA BAY† indents the mainland on the western side of America bay, in a S.W. direction; it is nearly a mile wide at its entrance and 2 miles deep, and is perfectly sheltered from all winds. There are a few natives settled on the eastern shore of the bay, and a small Russian military settlement consisting of about 50 persons; formerly a force of 200 men was stationed here. There are no roads, and many of the houses, which were well built of large logs of wood, are falling to decay. The harbour has an even depth of from 24 to 27 feet over the whole extent, and is too shallow for vessels of large draught. Tigers are numerous inland. Snow is said seldom to fall at Nakhodka, the cold is, however very intense.

Anchorage may be had in 4½ fathoms, soft mud. The rise and fall of tide is about 2½ feet.

Kozmin bay, about 3 miles south of Wrangel bay, affords fair anchorage.

The COAST from America bay to St. Vladimir, a distance of 150 miles, embraces mountain ranges, which do not rise higher than 3,000 feet above the sea. The coast is bordered by forests, consisting of oak, ash, birch, alder, and lime, maple, and cork trees; the oak is suitable for shipbuilding. Inland the trees are taller and thicker, and the mountain summits are clothed with coniferous trees. The formation of the coast is basalt, and is uniform along its whole line. It is thinly populated by the Tasa and Manza tribes, both of which are engaged in agriculture; they grow maize, millet, barley, and vegetables. During the summer they resort to the coast in great numbers, and collect seakale and shells; these natives are communicative and obliging.

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* *See* Admiralty plan :—Wrangel bay, on chart No. 2,511; scale, $m = 3 \cdot 0$ inches.

† *See* Admiralty plan :—Nakhodka bay on chart No. 2,511; scale, $m = 3 \cdot 0$ inches.

From Povorotny point eastward for 25 miles to Tcheniya bay, the coast forms several exposed bays and indentations.

Proceeding to the north-eastward from cape Zamok, high ranges of hills, some reaching an altitude of 2,700 feet, are seen a mile or two inland, and occasionally large tracts of country, densely wooded. The valleys occurring at intervals appear to be choked with undergrowth; no fields nor signs of cultivation meet the eye in any direction. Along the shore at short distances are met, in summer, villages of the migratory Chinese, sea-weed collectors; but these strike their tents in August, and proceed to the southward with the produce of their summer's work: no other sign of population was seen in passing.

Water.—As a general rule, along the coast of Russian Tartary, every valley which terminates on the sea-beach has its stream of excellent water, and generally in the summer months the sea is smooth enough to allow of boat-work. Drift-wood is generally to be found on the beaches and there are but few portions of the coast where wood cannot be cut in the immediate vicinity of any beach where landing may be effected.

TCHENIYA BAY[*] lies about 25 miles eastward of America bay, and is formed between Yakimova point, on the western side of its entrance, and Obrutcheva point to the eastward; it is small but commodious, being over 1½ miles in depth, and one mile wide at its entrance, slightly widening out within the harbour. Tcheniya bay is quite clear of dangers, open to the southward, and has depths over it ranging from 11 fathoms at the entrance to 4 fathoms at 2 cables from the shore, in the north-west corner of the bay. There is abundance of wood for fuel, and water may be obtained from the Talengoida river (on the north-west shore), on the right bank of which there is a settlement. There is another village in the north-east part of the bay; the rise and fall of tide is about 2 feet.

CAPE ZAMOK (Ostrovni or Island point)[†] is a bold, rocky, headland, between which and St. Vladimir bay the coast is remarkably clear of dangers, a fortunate circumstance where the navigator is so frequently enveloped in dense fogs. Its general trend is to the N.E., but it is broken occasionally by harbours and sandy bays. The coast line is usually a narrow fringe of large boulders and shingle, bordering steep cliffs and banks of 200 to 400 feet high. A small rocky islet (Zamok) lies off the cape.

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[*] *See* Admiralty plan:—Tcheniya bay, on chart, No. 2511; scale, $m = 3 \cdot 0$ inches.

[†] The coast between America bay and St. Vladimir bay was surveyed by the Russian schooner *Vostok* in 1861, and the description of this coast is principally from the report of her survey translated from the Russian Naval Magazine, May 1862. From cape Zamok to St. Vladimir bay was surveyed by H.M.S. *Actæon* and *Dove* in 1859.

Petrova and Beltzova islets.—At a distance of 5 miles from Ostrovni point, in a north-east direction, lie two rocky islands, situated half a mile from each other at a little over 2¼ cables from the shore, to which they are both connected by reefs. The southern, Petrova (336 feet high) is the largest, and the reef connecting it with the main is covered. The northern is named Beltzova, and the reef between it and the shore is uncovered.

SIAU-WU-HU BAY* (Preobrajenya), lies 6 miles to the north-eastward of cape Zamok (Ostrovni point), in lat. 42° 54′ 14″ N., long. 133° 50′ E., and affords a small but well sheltered anchorage in an inlet in its north-east corner. The bay itself is open to winds from the southward and westward, and is 3½ miles wide at its entrance between Petrova island and cape Creasy (its eastern entrance point), and about 2½ miles in depth, the depths shoaling gradually from 30 fathoms at the entrance to 5 fathoms at the head of the bay. From the southward, a hill 2,720 feet high (the most elevated in the immediate neighbourhood) is a good mark to point out its position; it bears N.W. by N. 4½ miles from Orekhof island which partly shelters the anchorage. Vessels requiring a refit would find the Inner harbour admirably adapted for the purpose, perhaps the most eligible place on the coast; but if it should be necessary to beach, it should be borne in mind that the rise and fall of tide is inconsiderable, and what little there is appears to be due to direction and force of wind.

From one mile outside cape Zamok the course and distance to Orekhof island is N.E. ½ N., 8 miles. This will lead clear of all danger, passing about a mile outside Petrova and Beltzova islands, both of which are connected by reefs with the mainland. Rounding Orekhof island give it a berth of 2 cables, and do not approach the dangerous spit extending one cable northward from the centre of the island to within a less depth than 6 fathoms. When the east side of the island comes in line with the extreme outer point of the mainland bearing S. by E., this danger will be passed, and good anchorage may be found in 6 or 7 fathoms.

Inner harbour.—Should it be desirable to enter the Inner harbour, a mid-channel course is quite safe; and excellent shelter will be found half a mile inside the entrance points in 5 to 6 fathoms, mud bottom, sheltered from all winds.

Tides.—There is no perceptible rise and fall of the tide.

Supplies.—An extensive plain on the north side of the outer anchorage affords pasturage for cattle, which are, however, small, but the beef is excellent. The country in the vicinity abounds in deer, but they are very shy and not easily got at. Vegetables are plentiful and wild grapes grow in the valleys ; wood is also plentiful. A few native families reside here permanently, they keep cattle and horses but demand high prices for them as well as other necessaries, accepting nothing but silver in payment.

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* *See* Admiralty plan :—Siau Wuhu bay, No. 2,716 ; scale, *m* = 4 inches.

Water may be obtained at a stream which flows into the north-east corner of the outer bay. The seine in the month of July afforded an abundant supply of salmon, a few small turbot, a large quantity of prawns, and a few other fish. Drift timber is plentiful along the beach, and any quantity of green wood may be had, by cutting it, and good hard-wood knees for boats.

CAPE CREASY (OLAROVSKI).—The north-east point of Siau-wu-hu bay is a bold rocky headland, the summit of which, 695 feet high, conspicuously marks the east side of entrance. Three small pinnacle rocks, 5 feet high, lie off the cape, one immediately under the highest cliff, its most southern point, and two on the west side of the cape, but they all lie within a cable of the shore.

ST. VALENTINE BAY,[*] situated 22 miles N.E. by E. from cape Creasy, is a little more than a mile wide at its entrance between Silina point and Orlova point, is quite exposed to the southward and eastward, and can only be recommended as a temporary anchorage for steamers. A sailing vessel might find difficulty in working out. The position of the bay is marked by a hill 2,370 feet high 1½ miles north of it; and its north-east side by four very conspicuous cliffs. The best anchorage is in 5 to 6 fathoms, sand and mud bottom, inside a cliffy point on the south side. There is a village in the bay, but no supplies could be obtained, with the exception of timber, and the water from the rivulet at the head of the bay soon becomes unfit for use.

CASTLE POINT, N.E. by E. ½ E. distant 15 miles from St. Valentine bay, is a remarkable bluff, its yellow cliffs rising almost precipitously from the beach to an elevation of 1,060 feet, and sloping gradually inshore gives the idea of a large hill half cut off.

BROKEN HEAD is a fine rocky promontory 660 feet high, situated 8½ miles N.E. by E. ¾ E. from Castle point, and is the termination of a range of hills, to the rear and northward of which is spread an extensive and well-watered plain, covered with rank vegetation, but void of trees. Off the south-east face of Broken head is a high rock like a shark's fin.

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[*] *See* Admiralty plan of St. Valentine bay, No. 2,511, scale, *m* = 3·0 inches.

MOSQUITO RIVER 2½ miles north of Broken Head, flows into a small bay and at the north-east extreme of a clean sandy beach, which, terminating in a rather steep bank, forms the west side of entrance, and a conspicuous rocky bluff the east side. Inside the entrance is a small basin of 3 to 5 fathoms water, quite sheltered from all winds, but too small to be available to any but small craft, as large vessels would not have room to swing. The bar at entrance had 13 feet on it in 1859, but probably winter frosts alter the depths.

Supplies.—Drift wood may be obtained in small quantities along the beach, and there are some trees a considerable distance from the entrance of the river. Water can be pumped in alongside on the ebb, or brought by boats from the higher parts of the river.

White cliffs.—From 8 to 9 miles N.E. of Broken head are a line of conspicuous white cliffs on the sea face of a wooded range.

ST. EUSTAPHIA BAY, N.E. ½ E. distant 13 miles from Broken head, is a small bay open to southerly and easterly winds; it is a little more than a mile wide at its entrance, and about the same depth. Anchorage may be had in from 4 to 5 fathoms, sandy bottom, but the anchorage is exposed.

The COAST from St. Eustaphia bay takes an E.N.E. direction for 7½ miles to Nizmenny and Low Table point. Along the coast the mountains slope gently to the sea, and are covered principally with leafy timber. Mount Kruglaya, 1,920 feet high, is a conspicuous mountain about 2½ miles inland, midway between Eustaphia bay and Low Table point.

LOW TABLE POINT, at 20 miles N.E. by E. from Broken head, notwithstanding its appellation is 120 feet high, but it bears the name given it probably on account of the perfectly level nature of the country in its immediate vicinity; it is bordered with a vertical cliff, extending 2 miles to the eastward from the base of a conspicuous round topped mountain about 1,200 feet above the sea. It is especially useful in making Olga bay from the southward, before Table point is seen; and being the only piece of tableland in the neighbourhood will readily be recognised. A few rocks are off it, but they are quite close inshore, and no dangers are known.

OLGA BAY,* in lat. 43° 41′ N., 11 miles N.N.E. ½ E. from Low Table point, was discovered by H.M.S. *Hornet,* in 1856, and named port Michael Seymour. It is open to the southward, but there is shelter from all winds in its northern part, in 10 fathoms, muddy bottom. The bay is covered with ice for 4 months in the year; it is, however, said to possess a milder climate than Vladivostok.

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* *See* Admiralty plan :—Olga bay, on chart No. 2,511; scale, *m* = 1·5 inches.

Brydone island (Chikachef), connected by a reef to cape Scott, the northern entrance point to Olga bay, is steep-to, and appears white from seaward; between this island and Manevski point, the south entrance point, the distance is 3 miles; from these points the bay narrows to one mile, between cape Peschurof and cape Sacken, after which it again widens and forms a bay 1½ miles in depth and about 1¼ miles in width.

Tikaya, or Inner harbour.—A narrow passage, named Brown channel, at its north-east part, leads into an inner harbour or estuary, which is easy of access and well adapted for careening purposes, as there is but little rise and fall, the water at all times smooth, and deep close to the southern bank; a river disembogues at its head. Brown channel has only 3½ fathoms water in it, deepening to 6 and 7 fathoms towards the inner harbour, on the shores of which the Russians have a small military settlement, and the buildings are substantial. There is also another village (Nozinka) about 1½ miles inland, and a Chinese settlement on the eastern side of the bay.

In 1874–75, fourteen vessels of from 200 to 400 tons called at Olga bay for the purpose of loading with sea cabbage, which is collected by Chinese. During that year the value of the above commodity exported amounted to the large sum of 75,000*l*.

The village of Nozinka, 1¼ miles from the settlement, as also the two villages Permskaya and Fudé, situated on the west side of Olga bay, 3⅓ miles from the entrance to the Avakum river, are inhabited by peasants from different districts in Russia. Tigers are abundant.

Buoy.—A red buoy marks the edge of the reef which extends from the northern shore of Brown channel, and it is said to be also marked by stakes with broomheads.

Avakum river flows into the north-west angle of the port; its mouth is broad and shallow, with only 3½ feet on the bar, but soon deepens when crossed, and flows in the bed of a deep valley, with high mountains on either side; few places are void of vegetation, save some abrupt and precipitous crags, the valley itself consisting of marshy and turfy land, with flat islands in the course of the river. A few miles up, the river divides into branches, and becomes shallow and narrow; there are some native settlements on its banks.

Petrova rock, having 5 feet on it, with 5 and 6 fathoms round it, lies 6 cables E. ½ S. of cape Linden on the western coast at the entrance to Olga bay. A surf sometimes breaks on this rock, and large flocks of geese settle on it; it is marked by a perch beacon.

Supplies can be had in moderate quantities only, though there are plenty of cattle and sheep at the settlement, and the seine will always procure an abundance of capital fish, such as salmon and trout, in any spot where it is possible to haul it, and particularly near a stream; a few fowls may also be procured, and small supplies of fresh butter, beef and mutton. The watering stream flows through a valley on the eastern side of the port, near the ordinary anchorage. A thick growth of oaks, hazel, and willows completely hides it from view. Wood may be obtained in any quantity; also good oak knees for boats.

Directions.—The positions of Olga bay may be easily known when approaching it from the northward by Brydone island, on the eastern side of entrance, and the only one on this part of the coast. The island is steep on its eastern side, sloping on its western, and is joined to the mainland by a reef of rocks; no bottom with 20 fathoms line was obtained within a quarter of a mile from its southern side, which appears to be free from danger. When within the entrance keep the starboard shore aboard, but not nearer than 1¼ cables distant, as it is fronted by a steep bank.

Approaching from the southward, the entrance will be recognised by the opening in the land. Brydone island is not distinguishable at any great distance, as, being only 325 feet high, it looks like a cliff of Mount Sacken, the hill, 1,341 feet high, behind it. A vessel can pass between Petrova rock and the western shore of the bay in 13 fathoms; but it is advisable to keep to the eastward of the rock, *i.e.*, keep the eastern shore on board, and if intending to enter Tikaya harbour, the narrow entrance to which (Brown channel) is only a cable wide, the eastern coast should be kept close-to until within a short distance of the inner point off which there is only 9 feet.

Anchorage may be obtained in the inner harbour (Tikaya) in 5 fathoms muddy bottom, perfectly sheltered; but only vessels of less than 18 feet draught can enter. Large vessels should moor. The outer anchorage is very exposed and the holding ground not good.

Tides.—It is high water, full and change, in Olga bay at 5h. 30m., and the rise is about 2 feet.*

The COAST northward of Olga bay for 20 miles is bold, rocky, and steep-to, and bordered by a lofty mountain range. The white chalk cliff on cape Lunden is a conspicuous object.

ST. VLADIMIR BAY, in lat. 43° 54′ N., 19 miles northward of Olga bay, was discovered by the Russian frigate *America*, in 1857. Its entrance, 1¼ miles wide, and open to the east, is formed between North head or cape Ballouzek, 347 feet high, to the north, and South head, or cape Watauski, 712 feet high, to the south, both of which, when approaching the bay from the east or north-east, appear like islands, each being connected with the mainland by low isthmuses. From thence the bay extends westward, and forms three arms, one to the north, one to the south, and the other, the smallest, to the west. The north and south arms are large circular basins separated from each other by a hilly and wooded peninsula, and both are surrounded and sheltered by adjacent high hills covered with wood (oak and fir), and the ground is covered with underwood from 2 to 3 feet high. The valleys are filled with long rank grass. The depths are about 15 to 5 fathoms in both arms.*

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* Vice-Admiral Tusin gives 5 feet as the rise.

The North bay is clear of all dangers, its eastern shore is, however, shoal, there being 5 fathoms half a mile from the shore. The northern bay forms an excellent harbour.

The West bay, between Kuzmina and Roudanoffski points, is comparatively shallow. A bank named Artibasheva with only 2 feet on it lies in mid-channel at the entrance. Vessels entering this bay should close the northern shore, but it is recommended to anchor either in North or South bay in preference.

The South bay is well sheltered from all winds and has good holding ground, a slight swell is, however, sometimes experienced there. To the south it communicates by a stream with a lake of 16 to 10 feet water, which with little trouble might be formed into a graving dock. A few Tartars (the only inhabitants) occupy some huts in the north-west corner of this arm and cultivate a little land, otherwise there are no signs of cultivation.

There is no fixed population in St. Vladimir bay, and from the report of other natives, it appears that these arms are only frozen over from the middle of December to the middle of February ; the entrance of the bay remains in a great measure free from ice by the effect of the offing swell.

Orekhova (Low) point on the east side of the entrance to South bay, has a stony reef, over which are shallow depths, extending 2¼ cables westward from it.

Supplies.—A few bullocks were seen, but their owners would not part with them for anything but sycee silver, refusing dollars. Some potatoes were obtained, and a quantity of wild onions. The seine gave a good supply of salmon (July and August), some small turbot, and prawns. Water can be obtained at three or four different places. Deer are numerous.

Drift-wood abounds on the beach, and any quantity of green wood can be had for the trouble of cutting. There is a species of dwarf oak, which furnishes excellent boats' knees.

Tides.—The tides are irregular in St. Vladimir bay. It is high water, full and change, at 1h. 0m., and the range is about 2 feet.

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* *See* Admiralty plan :—St. Vladimir bay, No. 2,773 ; scale, *m* = 3 inches.

Directions.—Approaching St. Vladimir bay from the southward, the coast between Olga bay, and it will present an almost uninterrupted line of steep cliffs, ranging from 250 to 400 feet high. Pinnacle and Chetyrek points are the only remarkable features on it; the former may be known by its having at its extreme a sharp single needle rock. Chetyrek point, which is 3¼ miles S.S.W. of the South head of the bay, is formed by three rocky summits, and will be readily distinguished. Deep soundings were carried very close inshore, there being 20 fathoms and upwards at a mile from the land; little warning, therefore, may be expected from the hand lead. No unseen dangers are known. A few detached rocks were met with, but all within a cable's length of the shore.

Having passed Chetyrek point, South head will be readily recognised, and may be rounded at a distance of 2 cables. If intending to anchor in the south arm, from the entrance steer for the south-east part of Roudanoffski point or rather peninsula; it appears like a cliff, and its summit is 205 feet high. Give Low point (Orekhova) a berth of, at least, 3 cables, in rounding it, and pay particular attention to the lead, not approaching the point into less than six fathoms water, as the stony ledge extending off it is rather steep-to.

Approaching the bay from the east or north-east, North head being quite clear of all hidden danger, may be passed at 2 cables distant, and the anchorage in the south arm steered for, using the same precaution on approaching the vicinity of Low point as before directed.

Anchorage.—The most prudent plan to adopt is to steer for the south-east part of Roudanoffski point, until the extreme point of North head bears N.E.; then steer S.W., keeping that bearing on astern until Low point which has a beacon on its extremity, bears E. by S., when steer for the centre of the low isthmus connecting South head with the mainland, and anchor in 10 fathoms, with Low point bearing North, and the highest part of South head, E. by N.

The COAST from St. Vladimir bay trends in a N.E. by N. direction to Barracouta harbour, in 49° 2′ N., then N. by E. to Castries bay, and is free from apparent danger. Its outline was but imperfectly known until 1855, when H.M. ships *Sybille* and *Barracouta* sailed along it, and determined the following points and anchorages.

SHELTER BAY (Oprichnik), in 44° 30′ N., affords shelter from north-east winds. Good fresh water can be obtained in a river a cable wide, with a bar at its mouth, within which there is a depth of 9 feet, over a fine sandy bottom. The land is high to the northward of this bay, and its aspect is that of bluff and barren headlands.

SYBILLE BAY (Plastoon), in 44° 44′ N., affords shelter from S.S.E. winds; its entrance is remarkable from having on each side some prominent pinnacled rocks, high and isolated, that off the north point being very conspicuous. The south side of the bay is high and rocky, with small deep valleys opening towards the sea; many large rocks lie along the beach. The north side consists of a series of hills, clay and sand; a cone shaped hill at the back being very conspicuous. The bay is closed by a broad valley, through which some streams run and form a small river, which flows into the bay. The soundings become gradually shallow towards the valley; the bottom is rocky, and covered by a thick growth of seaweed.

PIQUE BAY, in lat. 44° 46′ N., affords good shelter from N.E. and easterly winds. The best anchorage is in 5 fathoms, with the point bearing S.E. by E. There is good water in a river, separated from the bay by a spit of sand, at the mouth of which is a bar. Cattle may be obtained at this anchorage.

BULLOCK (TERNEI) BAY, in 45° 5′ N., affords but bad anchorage. Bullocks and fowls can be procured, but with difficulty, although they may be frequently seen near the beach; but it is necessary to search for the natives in the interior.

Luke or Shantz point, in 45° 22′ N., is high, bluff, and woody.

CAPE DISAPPOINTMENT (Bielkyna point), in lat. 45° 47′ N., has rocks extending a cable from it. Immediately behind the cape the land, when seen bearing about N.N.E., shows in three peaks close together, of nearly uniform height.

GULF OF TARTARY.—From cape Disappointment, the coast of Tartary trends to the north-east, and forms with the west coast of Saghalin island a long channel named the gulf of Tartary, which communicates with the gulf of Amúr to the northward by Tartary strait. This strait may be considered to begin on the parallel of about 51° N.; on the parallel of Castries bay the coasts of Tartary and Saghalin converge rapidly; and abreast cape Catherine, in 51° 57′ N., they are only 7 miles apart; 17 miles farther north, between capes Lazaref and Pogobi, they approach to within 3½ miles; and this is the gorge of the strait, and the entrance into the gulf of Amúr.

The ports most frequented in the gulf are Barracouta harbour and Castries bay on its western coast, and Jonquière bay, Dui, and Kosounai on its eastern; there are, however, on both coasts many indentations, which afford occasional shelter. The anchorage along the eastern coast (Saghalin) is safe during the summer months, when easterly winds prevail; but a vessel must be prepared to weigh, should the wind veer to the west.

The coast on both sides of the gulf is high, and there are no particular landmarks useful for seamen. On the eastern shore the country is everywhere thickly wooded, but in no way cultivated; towards the end of May or beginning of June, when the snow disappears, it has a most inviting appearance, and presents an agreeable variety of hill and dale with streams and torrents. It appears to be thinly inhabited by a simple-minded race of people of small stature and dark complexion, with features partaking of, but more developed than the Chinese character; they subsist chiefly upon fish, and consequently locate themselves on the sea shore. (For description of the west coast of Saghalin, see page 606.)

No dangers have as yet been observed off either coast of the gulf. The soundings decrease gradually towards its shores, though near the headlands, and where the coast looks bold, as may be expected, deep water is carried closer in, and the lead gives shorter warning of approach to land; a peculiarity, however, in the soundings has been noticed off some parts of the west coast of Saghalin, the water there being found to deepen when approaching within 3 or 4 miles of the land.

The soundings in Tartary strait, from 51° N. northward, vary from 46 to 26 fathoms, which latter is on the parallel of Castries bay, whence they rapidly decrease to 16, 10, 7, and 4 fathoms, in 51° 42′ N., abreast cape Chihachef, and which may be considered the bar of the strait, unless, indeed, there be deep water close under this cape or over towards Saghalin, which seems doubtful. To the northward of this spot the water deepens to 8 and 10 fathoms, which depth, with few exceptions, is carried up to the gorge.

The navigation of the gulf would be simple enough, were it not for the fogs which render it dangerous, requiring the greatest caution to be observed. It has been remarked by former voyagers that on nearing the land in these seas a vessel will suddenly emerge from the fog or find it lift; this was found frequently to be the case by H.M. ships in 1855–56, but of course it would not be prudent to run for the land in full reliance on such an occurrence; the best method appears to be to stand in cautiously for the land in the daytime, when a clearance from fog, as just described, may be met with. Frequently, however, the land will not be visible within a cable's length of it, and the noise of the surf will be heard before the coast is seen.

Ice.—From Castries bay across to Dui the strait of Tartary is quite closed by ice as far as the eye can reach during the winter months. It begins to disappear early in April. There is at that time communication between the mainland north of cape Lazaref and Saghalin by means of dog sledges over the ice.

Supplies.—Wood and water can be procured in abundance, and with facility on all parts of the coast of the gulf, and coal of fair quality in any quantity at Dui, the next anchorage south of Jonquière bay (*see* page 610).

Fish and wild fowl are plentiful; very fine codfish have been caught in soundings from 73 to 30 fathoms.

Tides.—The tidal streams in the gulf are regular close in shore, the flood stream setting to the northward, the ebb to the southward, the usual velocity being from 1½ to 2 knots an hour.

SUFFREN BAY, formed by cape Suffren to the south, in lat. 47° 20′ N., is but an exposed anchorage, surrounded by vast forests which extend out of sight. Its shores are fringed by a low shingle beach, on which the sea constantly breaks. The cape is fronted by rocks, which stretch half a mile into the offing.

Grossevitcha bay (Fish river), in 47° 55′ N., has anchorage off its entrance in 9 fathoms, at about a mile from the land sheltered from N.W. and westerly winds.

PESTCHANII or LOW POINT, in 48° 28′ N., lies between two bluff escarped headlands, and has a clump of pine trees upon it. The beach in the vicinity is sandy, and there is high land behind the cape; a depth of 8 fathoms was obtained a mile off shore. A short distance westward of Low point is a hill about 1,800 feet in height, having a flat table top forming a good landmark.

From Low point the coast line northward is irregular for 15 miles; its trend is then N. by E. 20 miles to Beechy head; it is steep-to, the lead giving 14 to 17 fathoms at 2 miles off shore. High snowy mountains are visible inland, and pine forests cover the ground to the coast, which is hilly, and in cliffs.

BARRACOUTA HARBOUR* (Port Imperial).—The entrance to this bay, in lat. 49° 2′ N., between Freeman (Milioutina) point on the north and Tullo island on the south, bearing N. and S. from each other, is one mile wide. The general depths in the bay are 5 to 15 fathoms over a mud bottom. The entrance is open to the north-eastward, but Barracouta harbour consists of several spacious inlets, in all of which there is sheltered anchorage in a convenient depth for all classes of vessels.

Barracouta harbour remains frozen for about the same time as Castries bay. Its shores are covered with wood fit for building purposes, such as the larch, fir, and stone-pine. The low rocky hills come steep down to the water, and are covered with forests of fir-trees, which, inland, attain considerable size and are large enough for spars for vessels. There is no cultivation.

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* *See* Admiralty plan:—Barracouta Harbour, No. 2,508; scale, *m* = 1·7 inches.

The natives of Barracouta harbour appear of a mixed race (Esquimaux and Tartar).

Southern bay (Babbington harbour), the largest inlet, is nearly 4 miles long in a south-west direction from the entrance, and is therefore open to north-east winds; it has an average width of about 7 cables, with small indentations on each shore. The depths shoal gradually towards its head.

Imperial river flows into the head of Babbington harbour by two outlets, and is apparently navigable for boats for a considerable distance. On the bar of the western mouth there is only a depth of one foot, and the greater part dries three-quarters of a mile outside the mouth.

Ustritza (Fortescue island).—Off Davis head, separating two of the largest of the indentations, at 2½ cables from the shore, and a little over 1¼ miles S.W. by W. of Tullo island, is Fortescue island, which stands out clearly and is a good mark for entering.

Zapadnaia (Pique) bay, the next largest inlet, takes a westerly direction for a distance of 3 miles; it is irregular and winding, with an average width of 3 cables, the outer part being named Pique bay, west of which, on the northern shore is Pallas bay.

Ice harbour, the remaining inlet, is about 1½ miles deep, in a north-east direction, but is only 3 cables wide, with depths of 6 to 10 fathoms in it. The head of this inlet is only separated from the sea by a narrow peninsula. There are a few native huts on its shores, as also in Babbington harbour and some of the other creeks. The natives trade in skins of the sea otter and in wild fowl.

Beacon.—On the north-east end of Tullo island is a quadrangular pyramid 27 feet in height and colored white * ; it is 87 feet above the level of the sea. There is also a similar wooden beacon on Pushiashina (Hill) point.

Carr bank, with 1½ and 2 fathoms on it, extends a cable off shore on the north-west side of the entrance, one-third the distance between Sybille head and Freeman point.

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* The beacon is not visible until bearing about West, when the harbour is well open. —Commander *Hon.* H. W. Hood, H.M.S. *Pegasus*, 1879.

Supplies.—Wild fowl and fish (especially salmon) can be obtained in moderate quantities.* Russian vessels of war resort to Pallas bay for wood (fir), which is collected by the soldiers stationed here, and is used by the Russian squadron for steaming purposes, instead of coal.

Directions.—Approaching Barracouta harbour from the northward, and having made Barren bluff, (Lesseps point) in lat. 49° 18½′ N., the three hills (Imperatorski hill) over Beechy head (St. Nicholas point) will be seen if the weather be clear, and by bringing the centre one to bear S. by W. it will lead to the entrance. The beacon on Tullo island points out the entrance to the harbour. At 3 miles N. by E. ½ E. from Freeman point the shore should not be approached within 2 cables, to avoid a rock on which the sea occasionally breaks ; it lies about a cable off a point bare of trees, at 2 cables from which the depth is 12 fathoms, and thence to Freeman point 13 to 15 fathoms. Pass the latter point at a convenient distance, and avoiding Carr bank proceed into the harbour.

Vessels bound into the harbour from the southward or south-east should make the land near Beechy head, which may readily be distinguished by some rocks above water, half a cable off its extremity. From Beechy head, which may be passed at a convenient distance, Tronson point, half a mile south of the harbour entrance, bears N.N.W., distant about 5 miles. This point is low, rugged, and devoid of trees, and should not be approached within 1½ cables ; between it and Tullo island the shore is clear of danger. Give this island a berth of a cable, at which distance there are 12 or 13 fathoms water, and then proceed to an anchorage.

Anchorage may be obtained in any of the numerous creeks of Barracouta harbour, but the best is in Pallas bay in 6 to 8 fathoms off the small Russian military settlement of Konstantinovski (consisting of only two or three houses, occupied by a corporal's guard), where there is a wooden pier 250 feet in length for unloading at ; the water here is nearly fresh alongside.

The next best anchorage is in Boulton cove, on its south side at about 3 cables S.S.W. of Fortescue island, but this latter is exposed to swell from seaward.

Caution.—Vessels approaching Barracouta harbour in foggy weather should not shoal their water under 40 or 35 fathoms, unless well assured of their position, and in all cases due allowance must be made for currents, which generally set along the coast to the southward in northerly winds, and to the northward in southerly winds. In strong breezes they have been found to run as much as 25 and 30 miles a day; they are sometimes, however, extremely variable.

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* Remarks of J. Jones, Navigating Lieutenant H.M.S. *Scylla*, 1866 ; and Commander *Hon.* H. W. Hood, R.N., H.M.S. *Pegasus*, 1879.

Tides.—It is high water, full and change, in Barracouta harbour at 10h. 0m., and the rise is 3 to 4 feet.

The COAST from Beechy head trends in a northerly direction to Castries bay, and is steep-to, with 15 to 18 fathoms at 2 miles off shore; 25 and 30 fathoms have, however, been obtained at a cable's length off cape Byki, in lat. 49° 35′ N. The coast assumes a bolder aspect in proceeding northwards. From Beechy Head to Barren bluff, the land, backed by high mountains, forms two ranges when seen from the offing; one of these mountains, cone-shaped and covered with snow, is visible 50 miles off. The steep coast is undermined in some places by the sea, and large masses of rock, which have been detached from time to time, form a dangerous rocky shore. The coast line is irregular, but by keeping outside a line, joining the promontories of Beechy head and Barren bluff, all the intermediate points are cleared.

Barren bluff (Lesseps point) is a high perpendicular headland. Vessels will find shelter under it during winds from N.N.E. to N.W. in 5 or 6 fathoms water, with its extreme point bearing N.E.

Cape Destitution (Byki), in lat. 49° 46′ N., is bold, high land, having a bay on its north side, which affords good shelter from southerly winds (S.E. to S.W.) in 9 or 10 fathoms, with the extreme of the cape bearing E.S.E., distant about one mile. Before approaching cape Byki, there is a wide and low forest extending for miles westward, backed by a high range of mountains. The cape is a bluff headland, bleak and rugged, with many traces of continual disintegration.

Cape Siourkum or Dent, in lat. 50° 05′ N., slopes to the eastward, and has a bay on its north side; at half a cable from its extremity is Gulf rock, of pinnacle shape, and about 20 feet high.

CAPE DUGA (lat. 51° 16′ N.)*—There are two stony islands, abreast the cape and river Duga, visited in spring by the natives to collect the eggs of sea-birds.

About 5 miles north of cape Duga, there is a remarkable headland, and when seen bearing N. by E. or S. by W., presents the appearance of a rocky column, behind which is a round hump-like knoll, whence the land gradually rises to the westward.

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* *See* Admiralty chart:—Tartary strait, No. 2,650; scale, *m* = 0·25 of an inch.

CASTRIES BAY[*] is used by vessels to procure a pilot, or to discharge their cargoes, when bound to the Amúr, as those above 12 feet draught cannot enter that river. Its entrance is 4 miles wide between Kloster-Camp, or Quoin point on the south, and Castries point on the north ; Quoin point is in lat. 51° 25′ N. Although the greater part of the bay is open to easterly winds, which throw in a heavy sea, yet vessels, if their draught will permit,will find shelter behind the islands in it, particularly at its head on the west of Observatory island. The bay is covered with ice from the middle of November or December to April, being open to navigation only for 7 or 8 months in the year. The isthmus which separates it from the principal branch of the Amúr is not more than 40 miles across, and lake Kyzi is only 15 miles distant. At the head of the bay is the Russian settlement Alexandrovski, composed of about 40 wooden houses inhabited by a guard of about 100 men. Beyond the limits of the settlement there appears to be very little of the country cleared. There is, however, communication by road with other Russian settlements on the coast.

The general nature of the ground in this bay appears to be mud, but from many circumstances this is supposed to be a mere superficial covering to a rocky or otherwise treacherous bottom.

Oyster island, a small island about 2 cables in extent, lies 1½ miles S.S.E. ½ E. from Observatory island. From the north point of this island a reef of rocks extends 3½ cables to the northward; its extreme edge is marked by a beacon coloured red and white.

Vostok bank, upon which the sea occasionally breaks heavily, but which does not show in smooth water, lies in the middle of the entrance, with the western part of the promontory (the east extreme of which is Quoin point) in line with the bluff headland beyond, bearing about South. Its north end is marked by a buoy coloured red and white, and its south end by two perches coloured red. The north end of Observatory island bearing West, leads well to the northward of it.

Novik bank.—A flat rocky bank with only 5 feet on it lies about midway between Oyster and South islands, in the south-eastern part of the bay; its extremes are marked by beacons, the northern white, the southern red.

Beacons.—On a small point (Klikoff) east of the settlement are two white beacons with triangular frames respectively 90 feet and 66 feet high. When in line and bearing W.N.W. they lead nearly midway between Vostok bank and Oyster island, to the anchorage off Alexandrovski.

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[*] *See* Admiralty plan :—Castries bay, scale, $m = 0{\cdot}7$ of an inch, on chart of Kuril islands, No. 2,405.

Half a mile to the northward of d'Assas point is a small waterfall, a useful mark in thick or foggy weather.

Telegraph.—The telegraph cable connecting Saghalin island with Siberia crosses the gulf of Tartary from the north cove in Castries bay in a S. 55° E. direction (passing north of Basalt island and Vostok bank) to Jonquiere point, thence along the coast to the port of Alexandrovski, at the mouth of Dui river. Castries bay is also in telegraphic communication with China, Japan, Vladivostok, and Nikolaevsk on the Amûr.

Supplies.—Salmon trout,* turbot, and cod-fish may be purchased from the natives. Flour and sugar in small quantities, and occasionally meat and potatoes can be obtained, but supplies of this kind cannot be depended on. There is also regular communication with Nikolaëvsk by steamer in summer and by sledge in winter.

Fresh water can be filled into casks from the small river at the settlement close to the telegraph station. Quantities of firewood may be obtained.

LIGHT.—On Klostercamp (Quoin) point, at the entrance to Castries bay, is exhibited† a *fixed* white light, elevated 262 feet above the sea, which should be visible in clear weather from a distance of 18 miles seaward. The lighthouse, which is painted red with a white lantern, is situated 42 feet westward of the site of the old lighthouse (since removed), and is 69 feet from the south extreme of the point.

Fog Signal.—During thick or foggy weather a bell will be sounded, and in the event of the report of a gun being heard from seaward, a gun will be fired.

Directions.—In making the bay from the southward two small high and barren islets will be seen near the coast, about 16 miles southward of Quoin point. In entering the bay and passing southward of Vostok bank, the reef, which extends a considerable distance from the north end of Oyster island (the north end of which is marked by a red and white flag), must be guarded against, but the channel is in other respects clear of dangers. The white beacons on Klikoff point in line (bearing W.N.W.) leads in mid-channel between these dangers.

Anchorage should not be taken up in the bay South of Oyster island, the bottom being soft; several vessels have been driven on the beach in westerly gales.

The best anchorage is with Castries point bearing N.E. by E. ½ E. and St. Catherine point S.E. by E. For large vessels the best anchorage is in 4½ fathoms, mud, 4 cables W. by S. from Oyster island.

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* A good place for hauling the seine is 200 yards inside Somon bay spit, on the north shore, the best time being at two-thirds flood.

† The light is reported to be shown only from 13th May to 13th November, and occasionally to be only visible from a distance of 4 miles.

Tides.—It is high water, full and change, in Castries bay at 10h. 30m., springs rise 8½ feet, neaps rise 5½ feet.

CAPE SUSCHEF or SUTCHOFF, situated N.E. ¼ N., 14½ miles from Castries point, has deep water close off it; northward of cape Sutchoff there is a small bay, affording anchorage in 4 to 5 fathoms, with the cape bearing S.S.E.

Capes Catherine and Nevolskoi are steep bold headlands of moderate height, and densely covered with wood. Catherine is marked by a white cliff. Nevolskoi is a sloping point; and from 2 to 3 miles N.N.E. from it is a shoal the eastern side of which is marked by a red buoy.

Pilots.[*]—Between Castries bay and Nikolaevsk, on Amur river, there are no regularly authorised pilots, but boatmen of the Siberian fleet, well acquainted with the fairway channels of Amur river, can be obtained at Castries bay by application to the military commander, and at Nikolaevsk to the captain of the port. No charge is made for this pilotage by the government, but generally a sum of fifty roubles is paid to the men, who are not furnished as responsible pilots, but as guides.

The GULF of AMÙR or Saghalin, is 70 miles long, north and south, and 25 miles at its greatest breadth. The waters of the river Amùr, which flow into this vast basin with great rapidity, have formed banks of sand and mud, which cover almost its whole surface, barely leaving the shallow channels by which the stream flows on one side to the sea of Okhotsk and on the other to the strait of Tartary; this renders the entrance of this great river difficult and at times dangerous.

The South channel.—Immediately north of cape Lazaref, at the south entrance of the gulf, the channel from the strait of Tartary divides into two branches. That to the N.N.W., narrow and slightly winding, is called the South channel, and keeps close to the Tartary shore, passing the isles of Chomé and Hagemir; it bends abruptly around cape Prongé, and thence holds a N.W. course to Nikolaevsk, which is 65 miles from cape Lazaref. The channel varies from one-quarter of a mile to 2 miles in width; the depths are generally small, but occasionally are as much as 14 fathoms. The least water is 2¼ fathoms, and a flat with this depth extends for nearly 10 miles between Korsakof and Prongé points, and this may be considered the real bar of the river, and must be crossed to enter it. Beyond this bar the water deepens, and 11 fathoms are found abreast the town of Nikolaevsk, above which the river is said to be navigable for 1,500 miles.

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[*] Mr. Anderson, master of ss. *Appin,* recommends commanders of steam vessels under 13 feet draught to dispense with the services of pilots for the Amur, unless able to communicate with them in the Russian language. Instances have been known of a vessel taking the ground from the master and the Russian pilot not understanding each other.

Saghalin Fairway.—The N.N.E. branch, or Saghalin Fairway, is wider and deeper than the other, the least depth being 18 feet at low water, according to the Russian chart made between the years 1849 and 1854. It keeps along the Saghalin shore at about 5 miles distant, for nearly 60 miles, until just north of cape Halezof, where it almost touches the coast; and 20 miles farther north, between capes Golovachef and Menshikof, 16 miles apart, it opens out into the sea of Okhotsk.

The North channel.—A narrow gut, dignified with the name of North channel, leads close to cape Tabak, the north point of entrance of the Amúr, and then in a N.E. direction 30 miles to the sea of Okhotsk. The least water in it is 13 feet, until within one mile of the sea, where apparently there is a bar or flat of 6 feet (probably a closer examination would discover a deeper pass); but with a 6 feet rise of tide in the sea of Okhotsk, or with a northerly wind, in fine weather, vessels under 12 feet draught might, there is little doubt, pass over it.

The RIVER AMÙR, or Saghalin ula, is formed of the streams Shilka and Argun, which unite in lat. 53° 30′ N. on the frontiers of Russia and China. The former of these consists of the Ingoda and Onon; the latter being the main stream which rises south-east of lake Baikal, in the mountain chain called Khing-khan ula by the Chinese, and Yablonoi Krebit by the Russians.

The river flows east as far as Nertchinsk, and here it is said to be 600 yards wide, and very deep; then north, then again east, when it receives the Argun which flows from the south near Baksanova. The united streams, under the name of Amùr, continue to the east and south-east, receiving from the south the affluents Sungari and Usúri, and reaching its southern limit in 47° 48′ N., whence it turns abruptly to the north-east and east, falling into the gulf of Amùr between capes Prongé and Tabak, which are 8 miles apart. The length of the Amùr, including al its windings, is about 2,500 miles; it is navigable for large vessels as far as Nertchinsk, 1,500 miles from its mouth, in the summer season; in the winter it is frozen over.

Nikolaevsk.—The fortress of Nikolaevsk is built on the left bank of the river, at an elevation of about 50 feet above the sea and at 22 miles from the entrance; it formerly contained about 5,000 inhabitants, principally exiles; and the town was surrounded and defended by batteries and strong advanced works, nearly all of which have been dismantled. Nikolaevsk until very lately was the principal Russian military and naval station on the Tartary coast, but it has been abandoned for the more accessible and sheltered harbour of Vladivostok. Abreast the town the river is about 2 miles in width, and there are a number of small steam vessels which navigate the Amúr for nearly 2,000 miles. The channels leading from the gulf to the anchorage are frequently changing, owing to the great amount of débris sent down by the strong current of the river, and with the constant fogs, frequent squalls, and gales, would render the approach to them both difficult and dangerous were it not for the admirable way in which they are buoyed and beaconed.*

Supplies and assistance in the way of repairs are difficult to be obtained at Nikolaevsk. Bullocks may be obtained and quantities of salmon. Timber is plentiful, and the forests extend as far as the eye can reach, but the export of wood is strictly forbidden. There is postal communication with St. Petersburgh, but since the transfer of the Russian military head-quarters to Vladivostok, Nikolaevsk has lost much of its importance.

Tides.—The tides (ebb) are strong off Nikolaevsk, but there is no flood stream though the water rises.

Climate.—Owing to the vicinity of the sea of Okhotsk, with its masses of ice, and the easterly winds prevailing during spring, the seasons at Nikolaevsk are much more inclement than higher up the Amúr. Even at the commencement of September continued rains set in. October brings snow and cold, and at the end of the month or commencement of November the mouth of the river is frozen over. November, and the first half of December, are mostly clear; the temperature is low, the minimum being 39° Fahrenheit. At the latter part of December, and during January, severe snow storms, with westerly winds, render the communication between the different houses difficult and even dangerous. The temperature during that time rises often above freezing point. The river navigation does not open before May, while snow and ice are to be found in the forests and more sheltered bays as late as June.

Light.—Since the transfer of the naval yard to Vladivostok the light on Constantine island has been discontinued.

Directions.—A vessel entering the gulf of Amúr from the strait of Tartary should proceed with great caution, and have an anchor ready at a moment's notice.

The intricate navigation commences off cape Suschef which lies N.E. $\frac{3}{4}$ E. distant 14 miles from Castries point; here the strait between capes Suschef and Thik narrows to 23 miles, and is divided into two channels by an extensive bank named Fox bank. The eastern channel is generally used, it being both wider and deeper than the channel westward of Fox bank. A shoal bank extends 11 miles westward from cape Thik and fronts the shore northward to cape Pogobi. Its western edge forms the eastern side of the channel.

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* *See* Admiralty plan:—Amur river, Nos. 861 and 862; scale, *m* = 1·7 inches.

Fox bank, a bank of sand, partly dry at low water, extends for 12 miles in a N.N.E. and S.S.W. direction, and lies nearly parallel with the shore of Russian Tartary. Its south end (3 fathoms) is 5 miles N.E. by E. from cape Suschef, in the channel between which there is a depth of from 6 to 8 fathoms.

Buoy.—An iron can buoy, coloured red and black, marks the south end of Fox bank. A short distance W.S.W. of the buoy is a broom stake beacon in 6 fathoms.

The north extreme of Fox bank approaches within 3 miles of cape Catherine, but the channel is narrowed to about three-quarters of a mile by the shoal bank which skirts the shore of the mainland and extends about 2½ miles from it in the vicinity of cape Glasenap (off which is an island), which bears about W. by N. from the north end of the bank.

Fairway buoy.—A white buoy in 4 fathoms marks the fairway eastward of Fox bank, from the buoy at the south end of which it bears E. by S. distant 4 miles. From the Fairway buoy, a N.N.E. course will take a vessel up to cape Catherine, distant 14¼ miles. Pass the cape at three-quarters of a mile, and alter course a little eastward of N.N.E. for cape Nevelskoi, distant 4 miles from cape Catherine.

Clearing mark.—Capes Catherine and Nevelskoi kept in line bearing N.N.E., clears the eastern edge of the Fox bank.

Two fathom patch, situated about three miles N.E. of cape Nevelskoi, is marked at its south end by a cask buoy, coloured red, and on the north end by a pole with a broom on it.

When cape Nevelskoi bears W. by S., steer N.E. by N., taking care to keep cape Catherine just open of cape Nevelskoi; this mark clears the shoal water which fills up the large bay between cape Nevelskoi and cape Muravief. When the white buoy marking Nevelskoi bank is passed, steer about N.N.E. for cape Muravief until Popoff island bears W. ½ S., when steer for cape Pogobi (on Saghalin island)—on which is a conspicuous white house, and south-eastward of it a sandy landslip—at the north-west end of which is a triangular white mark on a pole. Keep this course until Popoff island shuts in with cape Muravief and Ogby island opens clear of cape Lazaref; when steer direct for Ogby island, keeping it just open of cape Lazaref, which will lead clear of the flat extending off shore between cape Muravief and cape Lazaref.* The banks extending from cape Lazaref are marked by sticks with brooms, and by a white cask buoy with stake and broom head.

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* There are no buoys or marks off cape Muravief, or on the flat between it and cape Lazaref, until close to the latter, where the edge of the flat is marked by a stake. The stakes north-east of cape Lazaref have brooms instead of flags, the buoys are cask buoys.

A patch on which there is only 9 feet at low water lies about half a mile northward of cape Lazaref; a stake with broom head marks the position of this shoal.

Ogby island lies about half a mile north-westward of the cape. Steer to pass at about 3 cables to the north-east of the island, between two buoys which mark the fair channel, and thence N.W. by N. for a white buoy which marks the edge of the flat to the north-west.

Leave this buoy on the port hand, and steer about N.W. with Ogby island in line (astern) with the outer hill of cape Lazaref. This course will lead up to a red and white iron can buoy * situated north-east of Chakmut island, at which the two white triangular beacons on cape Ukhtomski (on the southern shore) will be in line. With this mark on astern steer N. by E. ½ E. for the buoy (coloured red and white, in bands)† which lies eastward of the Hagemir islands. Passing this buoy on the port hand steer N. ¼ W. for the buoy (coloured black and white in bands) moored in 3 fathoms, 5 miles to the northward, on the outer edge of the shoal water which extends south-east from cape Djaoré (Korsakof point). From Hagemir island north buoy, the triangular beacons on the south side of Korsakof point will be seen, and should be kept in line, bearing about N.W. by N. (the west side of the channel up to Korsakof point is marked with stakes); after passing Korsakof point the marks on the north side will be seen, and these, kept in line astern (bearing about South) lead up to the buoy (cask, coloured black and white) in 13 feet water off cape Ussi.

Anchorage.—Vessels may anchor anywhere in the fairway channel, the best positions being between capes Catherine and Nevelskoi, in 5 or 6 fathoms water; half a mile north-east of Chakmut island in 6 fathoms; and off Djaoré in from 3 to 3½ fathoms.

Directions for Amur river.—From cape Ussi buoy,‡ Lallo beacons kept in line N.N.W. ½ W. lead up to a broom stake in mid-channel; here increased care is necessary, this being the narrowest and shoalest part of the river, and steam vessels should proceed at slow speed, From the broom stake, the course should be altered to the northward, bringing the two beacons on the mainland, situated midway between Lallo village and cape Ussi, in line (astern) bearing S. by W. ½ W. until Uezut island bears West, when the two white triangular beacons on the slope north-west of Uezut* island should be kept in line N.N.W. ¼ W., and steered for. These beacons in line will lead up to another broom stake in mid-channel, and here two other white triangular beacons erected in a gap cut in the forest, upon a hill south west of Prongé point, will come in line ahead bearing N. by E. ½ E. With these marks on steer up to the bend in the channel, until the two white triangles, situated near Prongé village come in line astern bearing S.W. by W. ½ W., when proceed N.E. by E. ½ E. with these marks in line astern until the red buoy off Prongé point is reached.

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* The buoy is useful in returning south from the Amur river or should the beacons be obscured.

† The position of the Hagemir island south buoy is permanently marked by two sets of triangular beacons on the Hagemir islands, indicating the cross bearings.

‡ *See* Admiralty plan :—Amur river from cape Ussi to Tchnurrak point, No. 861; scale, *m* = 1·7 inches.

Pass on the western side of the red buoy off Prongé point, and steer close past Prongé point, leaving a stake and white cask buoy (marking the edge of the bank) on the port side; having passed which, bring the beacons on Prongé point in line astern on a S.E. ¾ S. bearing, which will lead up to a red buoy in mid-channel, from whence Nalé point beacons and cask buoy, should be visible. From the red buoy, steer for the Nalé point beacons in line ahead on a W. by N. ½ N. bearing, until the cask buoy (red and white) 3½ miles distant is reached. Thence, two triangular beacons on the south-west part of Prongé point peninsula kept in line astern, bearing S.E. ½ S., will lead up to a broom stake in mid-channel, when the white triangular wooden beacons of Little Tchkil point on the northern shore will come in line, and being steered for (N. by W. northerly) will lead up to a white buoy. From this white buoy, the beacons on Tchnurrak point (north shore) kept in line ahead N.W. ½ N. will lead up to a red buoy, from which the Meo point marks (on the south bank of the river) kept in line ahead† N.W. by W. ½ W. guide a vessel until the two beacons on Vassé point come in line astern bearing S.S.E. ½ E., and kept on will lead close past Tchnurrak point, upon which is a ruined battery.

After passing Tchnurrak point, two triangular beacons on the north bank of the river seen ahead, and in the same line as those seen astern on Vassé point, lead on a N.N.W. ½ W. course, in the deepest water along the north bank of the river (south of which are extensive sand-banks), until two other beacons situated nearer to Tchnurrak point and at the mouth of a small stream come in line, and these kept in line bearing E. ½ S., astern, lead up to Constantine island and to the anchorage off Nikolaevsk.

Anchorage.—Off Nikolaevsk a berth may be taken up in 7 fathoms, a convenient distance off the stake that marks Kuegda spit. This is the best position for discharging cargo, as the heavy barges, coming round the tail of Kuegda spit, have but a short distance to contend with the strong current running out of the river.

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* A rock with only 5½ feet water over it has been reported as lying in mid-channel, north of Uezut island; great caution is, therefore, necessary in this locality.

† *See* Admiralty plan :—Amur river from Tchnurrak point to Grand Duke Alexander islands, No. 862; scale, $m = 1 \cdot 7$ inches.

Water.—The Amur river water contains much lime, and has the effect of removing the paint from the bottoms of boats. In the early part of the season, when the ice breaks up, the river water is unfit for drinking, much decomposed vegetable matter being brought down at that period. To this, perhaps, may be attributed the fever experienced during the month of July by the crews of vessels at Nikolaevsk.

Tides.—The flood sets from S.W. to N.E. along the shores of Russian Tartary at the rate of 2 miles an hour. The tides of the Amur river, from Uezut island upwards, seem greatly influenced by the wind, the greatest rise taking place with a northerly wind, which sensibly affects (diminishes) the strength of the outgoing current at Nikolaevsk during the hours of the flood tide.

The flood tide sets strong around cape Nevelskoi to W.N.W. into the large bay between this cape and Muravief.

Between capes Catherine and Lazaref the flood sets to N.N.E., and ebb to S.S.W. at from 3 to 4 miles an hour; off Hagemir island at from 2 to 3 miles an hour. Fresh water from the river Amur extends as far as cape Djaoré.

At cape Lazaref the tide flows twice in the 24 hours, the rise is 6 feet, and sometimes as much as 9 feet at spring tides. Off the Hagemir islands the rise is 2 to 3 feet, and the ebb runs 3½ to 4 knots. Abreast of Chomé island, the rise is 4 feet, and the water remains at its highest level about fifty minutes. As far northward as cape Djaoré the flood occurs twice in 24 hours. From cape Djaoré (Korsakof point) to cape Prongé, there appeared to be no regularity in the tidal action, it being greatly influenced by the winds. It was high water only once in 24 hours and the tide rose one foot with a southerly and 3 feet with a northerly wind.

During the few days H.M. ships were off the northern entrance of the gulf of Amùr in 1855–56, the greatest rise of tide observed was 5 feet. The current from the Amùr set to the N.N.E. over the banks, sometimes 3 knots per hour. At cape Korsakof the tides meet; high water along the coast varying from 10.30 a.m. to 2 p.m.

The flood tide from the sea of Okhotsk enters through the north channel, flowing between the sand-banks in the direction of Saghalin; another stream flows round cape Golovacheff from the north and east, and meeting the other stream off the village of Petumboto, flows then along the shore of Saghalin to the southward through the Saghalin fairway with a velocity of 4 knots an hour. The rise of tide is about 5 feet, sometimes reaching as much as 10 feet at springs.

In the channel from the mouth of the river southward as far as cape Djaoré and northward to cape Puir, the water is always fresh.

SEA OF OKHOTSK.*—This sea, surrounded as it is on all its northern and western sides by the continent, and to the south-east by the Kuril islands, may be considered as completely landlocked. A large portion of its shores is comparatively unknown, for with the exception of its single important port, from which it derives its name, we have little or no accurate description of its details.

Whaling vessels frequent this sea from the beginning of July to the beginning of October, few, if any, being in it by the 10th October. The shores are covered with ice from November to April, but the main expanse continues open throughout the year, and being generally deep without any apparent danger, its navigation is safe, notwithstanding the fogs and storms with which it is often visited.

The western coast of Kamchatka is uniformly low and sandy to the distance of about 25 to 30 miles inland, when the mountains commence; it produces only willow, alder, and mountain ash, with some scattered patches of stunted trees. The soundings are shallow for a considerable distance off shore; nor is there at the entrance into any of the rivers more than 6 feet at low water, with a considerable surf breaking on the sandy beach. Those vessels that navigate this coast endeavour not to lose sight of it, and in foggy weather judge their distance from the land by the soundings, allowing a fathom for a mile.†

CAUTION.—Sailing vessels should not approach capes Elizabeth (the north point of Saghalin island) and Mary, within 20 miles, to avoid the current (they are occasionally swept helplessly round North bay, between these capes, towards cape Elizabeth), and the winds are generally light and variable inshore, whereas they are strong in the offing. By standing over to the Tartary coast the current is less strong, soundings are regular, and depth of water moderate, affording safe anchorage in case of calm or fog.

Care must also be observed in approaching the coasts of Saghalin and the shores of the sea of Okhotsk, their longitude in connexion with that of parts better ascertained being most probably erroneous.

The navigation to the northward of the gulf of Amúr during the summer months in unsurveyed waters where strong currents exist and thick fogs are so universal, is less dangerous than would at first appear, anchorage being commonly found when near the land, for a vessel to await the clearance of fog to ascertain her position.

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* *See* Admiralty chart :—Sea of Okhotsk, No. 2,388 ; scale, *d* = 2 inches.

† Foreign vessels are not allowed to carry on trading, hunting, or fishing, on the Russian coast or islands in the sea of Okhotsk, and Behring sea, without permission, which should be obtained at Vladivostok.

ST. JONA ISLAND, in lat. 56° 22½′ N., long. 143° 15¾′ E., is merely a bare rock, about 2 miles in circumference, and 1,200 feet high, surrounded on all sides, except the west, by detached rocks, against which the waves beat with great violence and which probably extend a considerable distance under water. With the island bearing North, distant 12 miles, Krusenstern had 15 fathoms water, but when it bore West about 10 miles, no bottom could be obtained with 120 fathoms.

SHANTARSKI ISLANDS lie off the western coast of the sea of Okhotsk, about 150 miles north-west of cape Elizabeth on Saghalin island, and although the largest island (Great Shantar) is 35 miles long, east and west, and about the same distance broad, it does not appear to afford any port or shelter ; though its south-west point projects to the S.W. so as to form a bay on the south side of the island. Between this point and the nearest point of the continent, 14 miles distant to the south-west, are two islets surrounded by rocks and reefs. Soundings of 30 to 40 fathoms, over a bottom of stones, will be found at 8 to 10 miles to the eastward of the group. The tides run from 1½ to 2 knots an hour.

To the southward of the south points of Great Shantar island are some small islands which have not been examined.

Fekshptoff island.—At 6 miles from the west side of Great Shantar is Fekshptoff island, 20 miles in extent, N.E. and S.W., and 10 miles wide, but it has no port nor shelter.

Southward of the Shantarski islands several deep inlets indent the coast in a southerly direction.

St. Nicholas (Usalghin) bay, the eastern of these gulfs, appears to afford secure shelter, but nothing is known of its capabilities.

Akademie gulf is reported to afford anchorage at its head in Oulbanski bay, as also in Constantine bay on its western shore.

Oudsky bay, an extensive gulf, westward of the Shantar group, has convenient water for anchoring in, but it appears to be very exposed.

The COAST from the head of Oudsky bay trends to the north-east for 135 miles to port Aian, is bold and steep-to. North-east harbour in lat. 55° 10′ N. is said to afford anchorage, but with this exception there are no known anchorages along this extent of coast.

Capes Negoshni (Ulgotni) and Vneshni, are the northern and southern points of the tongue of land which forms the eastern side of port Aian. The capes, as also the land between them, are composed of perpendicular cliffs of a chalky appearance, culminating in a peak about 1,200 feet high (Aian peak), which, when viewed from a distance, approaching it either from N.E. or S.W., appears as a small conical island.

PORT AIAN,* on the western coast of the sea of Okhotsk, in lat. 56° 25′ N., may be recognised from the southward by cape Vneshni or Outer cape, a high barren promontory with several craggy peaks upon it, at a mile eastward of its eastern point of entrance. The coast in the neighbourhood is high and bold, and at 3 miles in the offing the soundings are 35 and 40 fathoms, sandy bottom.

The inner part of the port is from one-quarter to half a mile wide, and three-quarters of a mile deep, and affords good shelter for small vessels in 2 to 4 fathoms, muddy bottom, only exposed to winds between south and S.E., from which quarter it seldom blows. The outer part of the port is exposed to S.W. and southerly winds, which send in a heavy sea; it has depths of 8 to 12 fathoms over good holding ground. On the west side of the entrance is a reef of rocks with 4 fathoms close-to, barely covered at high water; the eastern shore is steep, and may be closely approached.

The settlement, consisting of a few houses and a church, is situated in a valley on the north-east side of the bay.

The climate here is abominable, and fogs are uninterrupted; the ice breaks up in June, and snow does not always disappear before August. The port is frozen over in November.

Supplies are scarce in port Aian and difficult to be obtained, beef only being procurable. Water may be had from a small stream on the western shore of the bay, and firewood is plentiful. Scurvy is common and fatal among the inhabitants, but the wild rhubarb growing close to the sea in most parts of the harbour is of great service as an anti-scorbutic. Wild fowl are in abundance.

Directions.—Vessels approaching port Aian should make the land to the southward of cape Vneshni, which is remarkably prominent; from that direction only can the entrance be seen, and with northerly winds the fog frequently lifts from 2 or 3 miles off shore to leeward of that headland, when it remains thick elsewhere. The high land of the peninsula should be avoided, on account of the calm it occasions. In the event of falling in with the land to the northward of the cape, Malmarski island, if seen, will guide to the harbour; but to judge from the appearance of the coast in that direction, as seen from the heights of Aian, it should not be approached too closely.

After rounding cape Ulgotni at not less than one cable distance, keep the northern shore on board, and after passing a peculiar craggy point of rock the harbour will be fairly open. Steer up in mid-channel, and when past an isolated rock on the eastern shore good anchorage may be obtained in

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* *See* Admiralty plan:—Port Aian, on Chart of Sea of Okhotsk, No. 2,388; scale, $m = 1 \cdot 0$ inch.

5 fathoms, about midway between the eastern and western shores of the inner bay, with the settlement well open and the mortuary (a small building on the crest of the hill in a N.N.E. direction) open west of the church, about half a mile from the landing place, at the head of the bay.*

Tides.—It is high water, full and change, at port Aian at 12 hrs.; springs rise about 10 feet. A current sets strong to the eastward, out of the harbour.

ALDOMA BAY, 30 miles N.E. by N. from cape Ulgotni, is formed by the peninsula of Nurki (Vourki), which extends 9 miles in a southerly direction. The northern portion of Aldoma bay is about 6 miles in extent, but beyond a depth of 3 fathoms it is dry in most places at low water. In the north-west angle of the bay are four islets lying off the entrance to a large river.

Anchorage.—Good anchorage may be obtained in Aldoma bay in 3 to 5 fathoms sheltered from all winds except between S.S.W. and S.E. by E.

Malmarski islands, six in number, lie 9 miles south of the extreme of Nurki peninsula.

The COAST from port Aian to Ulya, a distance of 210 miles, forming the western shore of the sea of Okhotsk, is composed of high, bold cliffs, with mountainous peaks at the back extending some distance inland. From Ulya the coast trends to the north-east for about 30 miles to Okhotsk, and is low.

OKHOTSK HARBOUR, was formerly the principal port of the sea of Okhotsk, but the shallowness of the water a long distance from the entrance, and the violence and cross set of the tides at the harbour's mouth, preclude the possibility of its being easily accessible, except for vessels of small draught. The mouth of the river Okhota has only 9 feet water, and is only accessible from June to September, being blocked up with snow and ice during the remainder of the year. The beach for miles is covered with driftwood.

The town, now rapidly falling into decay, stands on a narrow tongue of land at the mouths of the rivers Okhota and Kuktúi. The population (in 1881) numbered 200, who exist by trading furs and fish for the necessaries of life. Not a tree, and hardly even a blade of grass, is to be seen within miles of the few houses and huts now standing, and a more dreary scene can scarcely be conceived. Summer consists of three months of damp and chilly weather, succeeded by nine months of dreary winter, as raw as it is intense. The principal food of the inhabitants is fish, which is also the staple food of the cattle and poultry. The sea of Okhotsk yields as much as fourteen varieties of salmon alone. Scurvy, in particular, rages here during the winter.

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* Information on port Aian from Mr. A. Ponsonby, commanding s.s. *Cleveland*, 1881.

There is communication with Europe once a month viâ Irkoutsk.

The NORTH COAST of the sea of Okhotsk, eastward of Okhotsk harbour, for a distance of 400 miles to the entrance of Ghijinsk bay, is almost unknown. Several large bays appear to exist along it, but of their capabilities as anchorages nothing is known.

GHIJINSK BAY is a large gulf about 100 miles wide at its entrance, which indents the mainland in a north-east direction, in the north-east part of the sea of Okhotsk. At about 150 miles within the entrance it divides into two narrower gulfs, that to the westward continuing in the same direction for about 90 miles and shoaling gradually towards its head.

Cape Varchalam, the western point of entrance to Gighiga bay (at the head of the western gulf), has sunken rocks off it. The tidal streams in its vicinity run with great velocity, and the cape should be approached with extreme caution.

GIGHIGA RIVER, at the head of the above-mentioned bay, is navigable for vessels of light draught. At the entrance is a trading depôt, and 12 miles up the river is the Russian settlement of Gighiga, containing (in 1881) 310 inhabitants, who trade in furs and walrus tusks.

Climate.—The climate is unhealthy, diphtheria, fever, and small-pox being very prevalent.

LIGHT.—On the left bank of the entrance to the river is a small lighthouse, from which, during the open season, is exhibited a *fixed* white light.

Supplies.—The only provisions procurable are reindeer flesh and salmon, the latter in abundance.

Weather.—On the east coast of Kamchatka a falling barometer indicates a southerly or south-westerly wind, with clear weather; and a rising, or high barometer, foretells northerly and easterly winds, with foggy and disagreeable weather. On the west coast, however, the reverse happens, as foggy weather sets in with southerly and south-west winds, and fine weather with easterly winds.

Tides.—It is high water, full and change, at 3 hrs.; springs rise 24 feet at Gighiga river; the flood setting to the northward, and the ebb to the southward.

The COAST from the entrance to Gighiga river trends S.E. for 10 miles to cape Chaibukhin, and thence S.S.W. 40 miles to cape Khalpih.

Morskaia Matuga islands, lying 2 miles north-west of cape Khalpih, are three in number. The island nearest the cape, about 250 feet in height, has a high tower-like bluff on its northern face, the southern part being lower, and the whole presenting a precipitous, rugged, and castellated appearance. The other two islands are about 150 feet in height, and level, terminating in bold cliffs.

Cape Telanski.—From Cape Khalpih the coast trends S. ½ E. for 21 miles to cape Telanski, a high, bold headland, without any signs of a beach on its sea face.

The COAST from Gighiga river to this cape is fronted by table-land of gradually increasing height (from 100 to 400 feet), having bold precipitous cliffs with small indentations here and there.

Telan island lies off cape Telanski.

PENJINSK GULF, the other arm of Ghijinsk bay, extends for 200 to 300 miles also to the northward, and its shores are quite unknown.

The WEST COAST of KAMCHATKA, the northern part of which forms the east side of Ghijinsk bay, extends southward for a distance of some 600 miles; its inhospitable shores are comparatively unknown, except to the Russians.

CAPE OMGON, in about lat. 58° N., is the western point of a large bay, 32 miles across, into which flows several rivers. The point is formed of high precipitous cliffs.

TIGIL RIVER, about 18 miles eastward of cape Omgon, is a considerable stream rising at Tepni, a place about 250 miles in the interior. The Russian settlement of Tigil is situated on the right bank of the river, about 30 miles from the entrance, and there is a village just inside the bar of the river. Tigil exports bear, fox, squirrel, and sable skins, which are annually bartered (for provisions) to a trading steamer visiting the place about August.

Anchorage.—A vessel of 14 feet draught may cross the bar at high water, and can moor head and stern in 8 fathoms, off the village. Outside the bar the holding ground is bad, but good anchorage may be had in 6 fathoms, with cape Omgon bearing W. by S., and the bar marks (beacons) in line bearing S.E. by E.

Supplies.—Beef, fish, and milk are plentiful and good; potatoes are also grown. Each household has its own pack of dogs for winter travelling.

Tides.—It is high water, full and change, at Tigil bar, at 11 hrs.; springs rise 22 feet. The tidal streams set with great velocity, the flood to N.E., and the ebb to S.W., the flood stream running longest.

Soundings.—There is a depth of 15 fathoms at 10 miles from the shore, shoaling to 6 fathoms, sand and shells, at 2½ miles from the bar, and thence shoaling gradually to 4 fathoms close to it.

Directions.—If bound from Tigil to Gighiga river the course from cape Omgon to Telan island is N.N.E. 180 miles. Steering this course Telan island will be first seen, a little on the starboard bow, and open of cape Telanski; but if made on a more northerly bearing it will be in line with the cape, and is then difficult to distinguish.

CAPE UTKOLOKSKI, situated 16 miles south-west from cape Omgon, is composed of high precipitous cliffs, its north point forming an abrupt peak with a bluff 400 feet high. The cape has much the same appearance as cape Omgon, for which it might easily be mistaken when approaching it from the westward. An island lies off the south side of the cape.

Kawachni bay, formed between capes Omgon and Utkolokski, is a deep bay into which flows a river of the same name.

Tides.—The tides in the neighbourhood follow the trend of the coast, the flood setting northward and ebb southward, attaining at springs a velocity of 3 to 4 knots; and forming off the prominent headlands heavy tide races.

Hargasoff point.—About 50 miles south-west from cape Utkolokski is Hargasoff point, off which is a group of islands.

Moroshetchnoe.—At 20 miles south-west from Hargasoff point is the mouth of the Moroshetchnoe river, and about 10 miles inland a volcano of the same name. Thence southward the land (which is high between Tigil and this volcano) becomes low, and continues so as far as cape Lopatka, the south extreme of the Kamchatka peninsula.

CAPE LOPATKA terminates in a low sandy point, off which, in a S.E. direction, is a small islet; eastward of this islet breakers were seen at about one mile off shore.

The SOUTH-EAST COAST of KAMCHATKA.—Very little is known of the shores of this peninsula; from cape Lopatka, its southern point, to cape Shipunski (Chipounskoi), a distance of 180 miles, the shores are bordered by lofty mountains, some attaining an altitude of nearly 20,000 feet, and are entirely uninhabited.

Cape Jelti, about 60 miles north-east of cape Lopatka, is from 300 to 400 feet high, having precipitous cliffs on its sea face, of a light reddish colour, sloping to the southward. Between capes Lopatka and Jelti the coast may be safely approached within a distance of 2 miles.

Anchorage, may be obtained on the south side of cape Jelti, in a bay protected by a reef on its east side, and by an island to the southward.

Cape Khadutka.—About 20 miles N.E. from cape Jelti is cape Khadutka, which forms the northern point of a large bay. The south extreme terminates in a steep bluff of a reddish and chalky appearance, rendering it a conspicuous landmark.

The COAST from cape Khadutka trends to the north-east for 14 miles to cape Piratkoff, and thence N.N.E. for 24 miles to cape Povorotni, forming two bays (Asatcha and Mutnaia). During the winter season the former is resorted to by sable hunters from Petropaulski, who make the passage in whale boats.

Listvenich and Akhomten bays.—From cape Povorotni the coast as far as the entrance to Avatcha bay trends nearly due north for a distance of 33 miles. On this coast are the bays of Listvenich and Akhomten, where anchorage may be had with fair shelter from westerly winds.

AVATCHA (OUTER) BAY.—The extensive outer bay of Avatcha is formed between capes Povorotnoï and Chipounskoi, which are the best landfalls for making for the port of Petropaulski; for should a vessel, when off either of these capes, be overtaken by thick fogs or strong East or S.E. winds, it is always possible to keep the sea; whereas should the port be made on its parallel, and the vessel surprised by any contrariety, her situation would be precarious, there being no soundings on the coast, nor any anchorage which could be taken under such circumstances.

AVATCHA BAY[*] is an extensive basin nearly circular in shape about 10 miles across in every direction, formed at the bottom of the large outer bay of the same name on the south-east coast of the peninsula of Kamchatka. It is the principal port of the peninsula, and so extensive and excellent that it would afford secure shelter for all the fleets in the world. The channel leading to the bay is 4 miles long and one mile broad, and there is anchorage throughout its whole extent; it trends in a N. by W. direction, and when the wind is fair vessels may sail through by keeping in mid-channel; but it frequently happens that they have to beat in, and as the narrowness of the channel renders it necessary to stand as close to the dangers as possible, in order to lessen the number of tacks, it will be requisite to attend strictly to the leading marks.

Over the whole of Avatcha bay there is an average depth of from 10 to 14 fathoms.

PETROPAULSKI.—The harbour of Petropaulski, on the eastern side of Avatcha inner bay, is small, deep, well shut in, and a convenient place for a refit of any kind. The Russian settlement stands at the head of the harbour, in an amphitheatre on the slopes of two hills, which form the valley, and is composed of small wooden houses, covered with reeds and dry grass, and surrounded by courts and gardens, with palisades; the houses are in a dilapidated condition, as Petropaulski has long been abandoned by the Russians as a military station. At the lower part of the settlement, in the valley, is the old church, remarkable for its fantastic construction, and for its roof which is painted green, but it is fast falling into ruin. A new church has been built by an American fur trading company; it is a conspicuous building with a square white belfry situated between Behring and Clarkes monuments. The only large habitation is the Fur Trading Company's premises at the back of the church.

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[*] *See* Admiralty plans :—Avatcha bay, with Petropaulski harbour, No. 1,040, scale, m = 1 inch; and Avatcha outer bay, No. 1:041, scale, $m = 0{\cdot}2$ inch.

The weather is frequently fine at Petropaulski up to the 15th October; but after this period it is wet, and the land begins to be covered with snow, which becomes permanent, and does not disappear until May or June in the ensuing year. In November, December, and January, violent storms are experienced.

During winter the cold is severe; the snow falls in abundance far from common, and frequently rises as high as the houses, which thus become buried until the return of spring; but whatever may be the intensity of the cold, it is rare that the roadstead outside is entirely frozen over; the harbour itself is generally frozen over from the beginning of November to the middle of May and sometimes as late as June.

From Behring and Copper islands the skins of the sea otter and fur seal are obtained in considerable numbers, and a very fair trade in both sable, bear, beaver, seal, otter, ermine, and fox is carried on, the value of which is said to amount to about 24,000*l.* annually.

Tareinski harbour, in the south-west part of the inner bay of Avatcha, is extensive and excellent, but as there are no inhabitants it is not resorted to.

Rakovya harbour also forms, to the southward of Petropaulski, an equally excellent port, but it is less easy of access than Tareinski owing to the Rakovya shoal, which lies in the middle of its entrance.

Supplies.—A vessel in need of repair will only find safe anchorage in Avatcha inner bay, and must depend on her own resources both for provisions and workmen. Wood is difficult to get, but water is easily obtained from a mountain stream about 2 miles from the town. A supply of fresh beef may be procured, and both milk and fresh butter, but it is difficult to get poultry or eggs. Fish is abundant; cod, herrings, salmon, and salmon trout may be caught.

LIGHT.—On Dalni point the eastern point of entrance, in lat. 52° 52′ N., long. 158° 47′ E. is exhibited a *fixed* white light elevated 449 feet above the sea and in clear weather should be visible at 24 miles. The light is visible between the bearings of E. by N. round southward to N.W. $\frac{3}{4}$ W. It is only lighted occasionally.*

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* Owing to its elevation it is often obscured by fog, which hangs about the summits of the cliffs when it is clear below.

Tides.—It is high water, full and change, in Petropaulski harbour at 3h. 30m.; springs rise 6¾ feet; neaps 4¼ feet.

Directions for AVATCHA BAY.—A sailing vessel bound to Avatcha bay from the southward should make the coast well south of cape Povorotnoï, and round it as close as possible, as the wind will in all probability veer to the northward on passing it. If the weather be clear, two mountains will be seen to the west and north-west of the cape, and one far off to the northward and eastward. The eastern one of the two former, mount Villeuchinski, 7,372 feet high, is in lat. 52° 42′ N., long. 158° 20′ E., and peaked like a sugar loaf. Mount Avatcha, the highest and most northern of the three, is 11,554 feet high, and may be seen in clear weather a very considerable distance. To the eastward of this peak, and close to it, is the Koselskoï volcano (9,058 feet), but it emits but little smoke.

These peaks are the best guides to Avatcha bay, until near enough to distinguish the entrance, which will then appear to be between two perpendicular cliffs. Upon the eastern one of these, the lighthouse bluff, there are a hut and signal staff. If the entrance of the bay be open a large rock, called Baboushka, will be seen on the western side of the channel, and three others, named Brothers, on the eastern side.

The outer dangers are, a reef of rocks extending S.E., about 1½ miles from the lighthouse bluff, and a reef lying off a bank which connect Stanitski point with the point to the southward of it. To avoid the lighthouse reef, do not shut in the land to the northward of the lighthouse bluff, unless certain of being 2½ miles off shore, and when within three-quarters of a mile only, tack when the lighthouse bluff bears North, or N. ½ E.: the Brothers rock in line with the lighthouse, leads close to the edge of the reef. At night keep the light in sight bearing N.W.

The first danger on the western shore has a rock above water upon it, and may be avoided by not opening Baboushka rock with the point beyond. In standing towards this rock, take care that the ebb tide in particular does not set the vessel upon it. A good working mark for all this western shore is the Baboushka open with Direction bluff (the *last* hill on the *left* upon the low land at the head of Avatcha bay); but there is a patch of 3½ fathoms lying just east of this mark abreast the north part of the cliffs round Stanitski point. The bay south of Stanitski point is filled with rocks and foul ground. The bluff on which stands the lighthouse is connected by a reef with the Brothers, and the lighthouse bluff must not be approached in any part within half a mile, nor the Brothers within a full cable's length. There are no good marks for the exact limit of this reef off the Brothers, and vessels must estimate that short distance; they must also, in beating through this channel, allow for shooting in stays, and for the tides, both ebb and flood, sweep over towards these rocks, running S.E. and N.E. Good way should also be kept on the vessel, as the eddy tides may otherwise prevent her staying.

To the northward of the Brothers, two thirds of the distance between them and a ragged cape, named Pinnacle point, there are some rocks nearly awash; and off the point there is a small reef, one of the outer rocks of which dries at half-tide. These dangers can always be seen; their outer edges lie nearly in line, and they may be approached to one cable's length. If they are not seen, do not shut in Rakovya bluff. There is deeper water outside the dangers off Pinnacle point than in mid-channel, and the soundings in the vicinity are irregular.

When northward of Stanitski point, the Baboushka rock may be opened to the eastward a little with the bluff north of it, but be careful of a shoal which extends about 3 cables south of Baboushka island. The Baboushka has no danger to the eastward, at a greater distance than a cable's length; and when it is passed, there is nothing to fear on the western shore, until N.N.W. of the bluff, off which there is a long shoal with only 2 and 2½ fathoms on it. The soundings shoal gradually towards it, and the helm may be safely put down in 4¾ fathoms; but a certain guide is not to open the west extreme of Baboushka island with Stanitski point.

When the vessel is one cable north of the reef off Pinnacle, she can stand into Ismennai bay, guided by the soundings, which are regular, taking care to avoid a 3-fathoms knoll, lying half-way between Pinnacle point and the second cliff north of it. This bay affords good anchorage, and it may be convenient to anchor in for a tide; there is no danger but the 3-fathoms knoll, and the Ismennai rock may be passed at a cable's length. This rock is connected with Ismennai point by a reef, and in standing towards it, Pinnacle point must be kept open of the lighthouse bluff (when in line the depth is only 3½ fathoms); Rakovya bluff in line with the bluff south of it, will place a vessel in 5 fathoms water close to the rocks.

A small reef extends one cable from Ismennai point and until this is passed do not shut in Pinnacle point with the lighthouse bluff; but to the northward of it a vessel may stand to about one cable of the bluffs.

Rakovya shoal.—Northward of Rakovya bluff is the Rakovya shoal, three-quarters of a mile long (E.S.E. and W.N.W.) and 3 cables broad, with a depth of 6 feet on its shoalest part, lying in mid-entrance to Rakovya harbour. To clear this shoal keep the Brothers in sight open westward of Ismennai point. There is no good mark for determining when the vessel is northward of this rocky shoal, and as the tides in their course up to Rakovya harbour will be apt to set her towards it, keep the

Brothers open, until it is certain, by the distance, of having passed it (its northern edge is nearly 9 cables from Rakovya bluff), particularly as the vessel may now stretch well to the westward, and as there is nothing to obstruct her up to the anchorage off, or inside, Petropaulski harbour.

Rakovya harbour will afford good security to a vessel when running in from sea with a southerly gale, at which time she might find difficulty in bringing up at the usual anchorage. In this case the Rakovya shoal must be left to the northward; 5 and 5½ fathoms will be close upon the edge of it, but the water must not be shoaled under 9 fathoms.

Directions.—Petropaulski.—In entering Petropaulski harbour it is necessary to guard against a near approach to the end of the peninsula on the western side of entrance (Shackoff point), from which a bank extends E.S.E. 3 cables from high water mark, and having 3 fathoms on its extreme point.* Keep the south end of the cemetery bearing N.E. until within 200 yards of the beach under it, this mark leads to the southward and eastward of the shoal in 6 fathoms, and from thence steer for the end of a low sandy point which projects at an angle of 45° from the direction of the coast, and nearly closes the bottom of the bay, forming it into an excellent natural harbour. This tongue of land, like an artificial causeway, is but little above the level of the sea; the point may be passed close to.

A sailing vessel leaving the harbour with light winds and with the beginning of the ebb, must guard against being swept down upon the Rakovya shoal, and when past it upon the signal bluff. There are strong eddies all over this bay, and when the winds are light, vessels often become unmanageable. It will be better to weigh with the last drain of flood.

Anchorage.—Vessels should moor as the wind is often very squally and shifty in the basin, and there is not much room to veer at single anchor.†

The COAST, from cape Shipunski northward to cape Krilon, distant about 36 miles, is indented with deep bays and inlets, some of which afford shelter from all winds except between North and N.E.

Kamchatka river, the entrance to which is in about lat. 56° 12′ N., is marked by two small beacons; on the bar there is a depth of 11 feet at high water spring tides. There is a high signal house near a village 2 or 3 miles north of the river entrance, and a pilot can be procured when required. The land in the vicinity is low and flat.

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* Valentine G. Roberts, Master R.N., H.M.S. *President*, 1855.

† Navigating-Lieutenant W. H. Stephens, H.M.S. *Egeria*.

CHAPTER IV.

MARIANA OR LADRONE ISLANDS; ISLANDS SOUTH-EAST OF JAPAN —MEIACO SIMA, LIU-KIU AND LINSCHOTEN GROUPS.

VARIATION IN 1884.

Mariana Islands 2° to 3° E.	Liu-kiu and Linschoten Islands 2° to 3° W.

Islands in the Western Pacific lying south-east of Japan, 1° E. to 1° W.

MARIANA or LADRONE ISLANDS.*—This archipelago is composed of a chain of volcanic islands, which extend in a north and south direction from lat. 13° 12′ N. to lat. 20° 32′ N. over a space of 420 miles. Magalhaens, the first circumnavigator, discovered them on March 6th, 1521, but he only saw Saipan, Tinian, and Guam. The Spaniards, who colonized them, named them Ladrones, from the supposed great propensity to thieving evinced by the natives, and this name they retained until 1668, when they received the name of Mariana, in honour of Maria Anna of Austria, the widow of Philip IV. King of Spain.

The whole archipelago is divided into three groups.

The southern consists of the islands of Guam, Rota, Aguigan, Tinian, and Saipan. These are the larger islands, and are of moderate height, but less mountainous than the remainder, and at present are the only inhabited islands of the Mariana group.

The central group consists of the Farallon de Medinilla, Anataxan, Sariguan, Guguan, and Pagan. These are a collection of large rocky islets rather than islands, in some of which the volcanoes are extinct; in the two latter, however, they are active.

The northern group, consisting of Agrigan Assumption, Urracas, and Farallon de Pajaros, are merely volcanic cones, of which the last only is active.

The population of the Marians is composed of Spaniards,† Chamorros (the aborigines), and Caroline islanders, the latter having been imported into the islands at various times commencing in 1866. The Caroline islanders are of somewhat striking appearance, tall, copper coloured, with long curly hair and long beards and moustaches; they are nearly naked.

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* The description of these islands is principally from the voyages of the *Narvaez* and *Hertha*, and the remarks of Don G. Casmargo as given in the Anuario de la Direccion de Hidrografia, año. 3, 1865; Annales Hydrographiques, 1875; and Annalen der Hydrographie, Berlin, Heft VII. 1876. *See* Admiralty charts:—Pacific ocean, N.W. sheet, No. 781, scale $d=0{\cdot}6$ of an inch; Islands between Formosa and Japan, No. 2412; scale, $m=0{\cdot}05$ of an inch; Mariana or Ladrone Islands, with plans, No. 1,101.

† The group is under the authority of a military Governor (resident at Agaña), and there is a small garrison.

The inhabitants of the Mariana islands are more vigorous than those of the Philippine islands, and they seem to be intermixed with the Malay race.

Deer and wild goats are found in abundance, and form the principal food of the Europeans; cows and pigs are also reared. Potatoes, maize, and rice are indigenous to the island; and cocoa, coffee, and hemp are cultivated.

Currents.—(*See* page 10.).

Tides.—The greatest rise and fall in the archipelago does not amount to 3 feet.

GUAM or GUAJAN, the southernmost and largest as well as most populous island of the Mariana group, is about 29 miles long N.E. by N. and S.W. by S.; its greatest breadth is about 10 miles, narrowing to 3 miles near the centre. It is bordered throughout a greater part of its circuit (except on the north-east side) by a chain of reefs, which are uncovered at times. In 1873 the population amounted to 7,000, of which 5,000 belonged to the town of Agaña and its suburbs.

At a distance this island will appear flat and even. There is no anchorage on its east side, (except for small vessels), which is bordered with steep rocks, against which the sea dashes with great violence. The north side of the island is rather low, the small hills of Santa Rosa (about 650 feet high) being the only elevation, but to the southward it is more mountainous, mount Tiniquio forming several peaks, of no great elevation however. The west side is full of small sandy bays, divided by rocky points. The soil is reddish, dry, and apparently fertile. The produce is chiefly rice, pineapples, water melons, bananas, oranges and limes, cocoa-nuts, and breadfruit, and there are numerous cattle on the island. The cocoa-nut trees grow on the western side in extensive groves, 3 or 4 miles long and one or 2 miles broad.

Pago harbour.—The eastern coast of Guam, as far southward as Tarofofo harbour in lat. 13° 18′ 12″ N., affords no shelter, and therefore ought to be avoided during the N.E. monsoon. The only openings are Pago harbour, in lat. 13° 24½′ N., accessible only for boats, and Ylic bay, 2 miles to the southward, and equally unimportant.

PORT TAROFOFO,* 4½ miles south of Ylic bay, is the only one except San Luis d'Apra, that will receive a vessel at all seasons of the year; there are no rocks in it, nor is there any danger. It is formed of two inlets, the northern of which, Tarofofo, about a third of a mile wide, is open to the east, in which direction it is 1½ miles long; the other, Paicpouc cove, is one cable wide and about 2 cables deep, but it is shoal at one cable from its head. The Tarofofo river, the most considerable in Guam, enters the head of the harbour and the Madreporic hills, very steep, rise abruptly from both its sides; the Mahilouc, on the north side, are celebrated in the history of the country. There is no village near this locality.

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* *See* Admiralty plan:—Port Tarafofo, on chart No. 1101; scale, *m* = 7 inches.

Hounlodgna bay.—From Tarofofo to Hounlodgna bay, 1¼ miles to the south-west, the land is low, with sandy beaches and rocky points; this bay is only fit for boats.

Ynarajan bay; at a mile farther to the south-west, is a quarter of a mile wide at entrance, and half a mile deep, but the reefs fringing the shore considerably contract the anchorage; the bay is open from East to South. A vessel would be quite safe in it during westerly winds, but not with winds from the opposite quarter. The town of Ynarajan is, with the exception of the church, entirely composed of huts, and in 1875 contained 276 inhabitants; it stands on the south-west side, and at the head of the bay are several streams.

Agfayan bay, at three-quarters of a mile farther south-west, is much smaller than the latter bay; it may have good anchorage for vessels of less than 15 feet draught, but it is open to the E.N.E. At its head is a small brook, where boats can easily obtain water.

South end of GUAM.—Ajayan point, the south-east extreme of Guam, forms the eastern side of Ajayan bay, which is so obstructed by reefs that it is dangerous of approach if there is much sea on. The south end of Guam is an uninterrupted sandy beach fronted by a reef, with two or three small islands on it. This reef, after encircling Bali and Cocoa islands, lying 2½ miles from the south-west extreme of Guam, trends the same distance to the northward to the south-west point of Guam, where is the small harbour of Merizo, only fit for boats.

UMATA BAY,[*] about 1¾ miles northward of the south-west point of Guam, is one-third of a mile deep, east and west, and three cables wide at its entrance. The bay is sheltered from North (round East) to South, but in the season of westerly winds, or from June to September, it would be imprudent, or perhaps impossible, to remain in it, on account of the heavy swell which sets on the shores.

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[*] *See* Admiralty plan:—Umata bay, on chart No. 1101; scale, $m = 13 \cdot 75$ inches.

Tougouéne point, the narrow, low, south point of entrance to this bay, has a reef projecting nearly 2 cables from it to the westward; a little north of this point is the fort of Nuestra Señora de la Soledad. The north point of entrance is an isolated and picturesque rock with a fort (San Angel) on it, which is approached by steps cut in the rock. These fortresses are little more than ruins, and have no guns.

The south shore is mountainous to the head of the bay, where the river Umata or Saloupa enters the sea, and where a church is built at the foot of the mountains. The town (or what remains of it) stands on the north shore, which is low, and was destroyed by an earthquake on the 25th January 1849. The present village (containing in 1875 only 157 inhabitants) consists only of a few huts, a small church, and the Governor's house, and a mass of ruins. Behind the town the hills rise in an amphitheatre, and are neither high nor remarkable. Excellent water can be obtained from a rivulet which flows into the sea on the south shore, between mount Inago and the hill on which fort Soledad is situated.

The whole of the island is cleared and partly under cultivation, and wood is difficult to procure, though there is any quantity on the island. There is little cut owing to the scarcity of labour.

Anchorage may be obtained in 7½ fathoms, sand and shells, with fort San Angel bearing N.N.E. ½ E., and fort Soledad S.E. by E. ½ E.

Facpi point.—From Umata bay the west coast of Guam trends N.N.W. 3 miles to Facpi point, and has several sinuosities, the deepest of which is Cetti bay, as large as that of Umata. Facpi point is remarkable for being pointed, projecting, and terminating in an isolated rock joined to the shore by a reef uncovered at low water. From hence to Oroté point, 6 miles to the N.N.W., the coast falls back 2 miles, and forms a bay, in which are several coves and islets.

Agate bay, 3½ miles to the S.E. of Point Oroté, has good anchorage in N.E. winds, but the landing is difficult on account of the reefs which line the beach.

The village of Agate, with its suburbs, have a population of 663; the curate's house and the church are the only stone buildings. Two miles northward is the small village of Sumay, where some supplies may be procured.

Orotépoint is the extremity of a narrow peninsula, projecting 3½ miles N.W. by W. from the coast, and which cannot be traversed on account of the number of large rocks and precipices which cover it. A small islet lies close to the north side of the point, and from it the north coast of the peninsula trends E. by S. and S.E. by S. to the village of Apra, which is built on the isthmus connecting the peninsula to the main land.

PORT SAN LUIS D'APRA.*—From Apra the coast trends round to the East and North, forming a deep indentation, named port San Luis d'Apra, the opening to which is nearly closed by a long narrow island, named Apapa or Cabras, the Luminan reefs, and the Calalan bank.

This port is extensive and safe, but is much encumbered with numerous banks, coral reefs, and islets, the whole of the south-east part of the harbour being entirely blocked by them.

Calalan bank.—The usual entrance is northward of the islet lying close to Oroté point, by a deep channel a third of a mile wide,† between that islet and the west end of the Calalan bank; but this end of the bank must be given a wide berth, as a shoal spot named Spanish rock lies half a mile from the north point of Oroté island, which may be passed at about 2 cables.

Luminan reefs, extending 1¼ miles westward from the west end of Cabras island protect the harbour from the northward. There is a channel, of 4½ fathoms water, beween the east end of Calalan bank and the Luminan reefs, but it should not be used without buoys.

Fort Santa Cruz.—In the centre of the port is a rock level with the water, on which stands fort Santa Cruz.

The general anchorage is about 2 cables north of this fort, in a space carrying 5 to 15 fathoms, muddy bottom, surrounded by coral patches 2 or 3 feet below water. Some of the channels leading to this anchorage are narrow, the last before entering being not more than 120 yards wide; but the patches are steep-to, and may be approached almost to touching. Landing is very inconvenient, the shore being everywhere fringed with reefs which extend a considerable distance from it, alternating in rocky heads and deep holes. These islets and reefs are of coral formation.

The best landing place if wishing to proceed to Agaña, is at Punto Piti opposite Cabras island, about 1½ miles from the anchorage; the point is whitewashed and there is a small pier.

Anchorage.—The best anchorage is with the west end of Cabras island bearing N.E., and fort Santa Cruz S.E. ½ S., in 22 fathoms; bottom coral sand.

Tides.—The rise and fall of the tide is from 3 to 4½ feet. Outside the harbour the current sets constantly to the westward.

Supplies.—Beef, fowls, and eggs, can be obtained, but no vegetables.

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* *See* Admiralty plan :—Port San Luis d'Apra, on chart No. 1,101; scale, $m = 2$ in.

† Is said to have contracted (1873) to 2 cables owing to the extension southwards of the Calalan bank.

The watering-place is at a small river which falls into the port at three-quarters of a mile from Santa Cruz fort. The casks are usually filled at low tide, and the boats sent at high water to bring them off.

The COAST, from the east point of port San Luis d'Apra, trends E.N.E. 1½ miles to a perpendicular rocky point, named Acahi-Fanahi, near to which is Gapan islet. At 1½ miles eastward of this islet is Adeloup point, better known to the inhabitants as Punta del Diablo (Devil point), on account of the rapidity of the currents, which makes it difficult to be doubled.

AGAÑA BAY.*—From Devil point a sandy beach commences, which trends to the east and north, forming Agaña bay, in the middle of which is the harbour and town of Agaña, the capital of the island and the seat of the government of the Mariana islands, containing about 300 houses (3,500 inhabitants) mostly built of wood, and on piles or pillars; the official buildings comprising the governor's residence, the arsenal, barracks, and prison, are of stone. There is a convict establishment here and some 500 troops. Poultry, eggs, and vegetables are the only supplies to be obtained. A small river, crossed by two stone bridges, flows into the bay near the town.

Agaña road can only be resorted to with winds from E.N.E. to South, and even then it is dangerous on account of the permanent heavy swell, and the great depth of water close to the reefs off the shore. From Agaña bay the north-west coast of Guam is composed of steep rocks.

Pilots.—Pilots for port San Lius d'Apra may be obtained by signalling off Agaña.

Tumun bay, at 1½ miles north-east of Agaña, appears filled with reefs, but there are several passages through them, where boats can reach the shore without difficulty. Near the middle of the coast of this bay is the village of Gnaton, inhabited entirely by Caroline islanders. From hence the coast is barren and uninhabited.

Point Ritidian.—A short distance inland from Ritidian point, the north extreme of Guam, the perpendicular hills form, scarcely without interruption, the circuit of the island. In the middle of the north face of the island, between Ritidian point and Patay North point, there is a bay, but it is fronted with coral reefs from the last-mentioned point as far as point Ritidian, where the coast is steep.

The eastern side of the island, southward of Patay East point (the north-east point of the island), is rugged and steep, and there is no shelter northward of port Tarofofo during the north-east monsoon.

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* *See* Admiralty plan :—Agaña bay, on chart No. 1,101 ; scale $m=2{\cdot}57$ inches.

Supplies.—Cattle, pigs, fowls, ducks, turkeys, and pea fowl are bred; and vegetables, fruit, and wild birds in great variety are plentiful, as is also fish.

Santa Rosa shoal (position doubtful), of which no description has ever been given, is said to be in lat. 12° 30′ N., long. 144° 15′ E. A Spanish galleon is said to have struck on it, and to have lost her rudder. Dampier, when approaching the south end of Guam, in 1686, sailed over a rocky shoal of 4 fathoms water.

Galves bank (position doubtful).—Galves also, in 1740, discovered a bank lying about 20 miles from the south-west end of Guam, in lat. 13° N.; it is probably the same as the Santa Rosa. The *Narvaez* passed very close to its assigned position, but saw nothing of it. Great caution, however, should be observed when in this locality, as the uncertainty of the positions of these shoals renders it doubly necessary.

Anson island placed on the charts in lat. 13° 0′ N. long. 141° 30′ E. is not otherwise known.

The channel between Guam and Rota (the next island to the northward) is 30 miles in width, and clear of known dangers.

ROTA, bearing N.N.E. ½ E., 30 miles from the north end of Guam, is 12 miles long (N.E. by E. and S.W. by W.), and 5½ miles broad; its highest part is about 600 feet above the sea. Its east and centre portions are hilly, but the land becomes lower to the south-west, to a low sandy isthmus on which the villages of Sosanlagh and Sosanjaya are built; they contain about eighty houses and huts. To the south-west of this isthmus is the south-west point, a hill terminating in a level and regular plateau. Some cattle, pigs, cocoa-nuts, bread fruit, bananas, and a few other vegetables, constitute the entire riches of the island. Three wells furnish the inhabitants with water; two of them are artificial and the water bad; the third, which is natural, affords better, though it is brackish. On the east coast of the island, at 5 miles from the villages, there is a rivulet of very good water.

The mountain summit is said to be a volcanic crater, but it has not been active for several centuries, and is now covered with an impenetrable growth of bushes and underwood.

Numerous monuments of rudely cut stone mark the burial places of the original inhabitants of the island before the Chamorros occupied it.

The south-east end of the island is tolerably high and perpendicular on the sea shore, presenting thus a straight wall, and at its angles vertical fissures like the embrasures of a fort. In other parts the land descends gradually to the sea, terminating in long and low points. The portion of the island not inhabited is so encumbered with bushes that it is difficult to penetrate; on the north side there are some cocoa-nut trees.

Rota is nearly surrounded by reefs. Its north-east coast and the south-east side of the isthmus are bordered with numerous rocks, on which the sea breaks more or less, according to the direction of the wind.

Sosanjaya bay, 4 miles wide and 2 miles deep, is formed between the south and south-west points of the island, in which vessels can find good shelter from northerly winds; but the bottom, being coral, is very foul. The shore cannot be approached, and if wishing to land it must be on the west side of the sandy isthmus, where a sort of stage or jetty makes an easy access for boats.

Anchorage may be obtained in Sosanlagh bay, but it is very bad, in fact, the worst in the whole Mariana group; the depth is very irregular, the bottom being patches of sand and coral alternating; and the vessel when at anchor is so near the breakers as to render it very unsafe.

The channel through the reefs in Sosanlagh bay requires the assistance of a pilot, and extreme caution is necessary.

Supplies may be obtained in moderate quantities either in exchange for money or clothes, tools, nails, &c., &c.; there is a great deficiency of water.

AGUIJAN ISLAND, 44 miles N.N.E. from Rota, is not more than 3 miles long and 2 miles wide. At its north part are high, perpendicular, and nearly naked rocks, except at their summits, which are crowned with thick wood. The only points fit for landing are on the west and north-west sides, where there are some small creeks bordered by sandy beaches. The coasts of the island appear clear of danger, with the exception of a rock lying a mile off its south-west point. The island is uninhabited, but goats are numerous.

The channel between Aguijan and Rota is clear of known dangers.

TINIAN ISLAND (or Buenavista) separated from Aguijan by a channel 5 miles wide, is 10 miles long, north and south, and 4½ miles broad, and in 1876 contained about 200 inhabitants, descendants of Caroline islanders who are engaged in rearing cattle and drying their flesh for the consumption of the inhabitants of the other islands of the group. It was celebrated, in Anson's voyage in 1742; he arrived here with his crew suffering from scurvy, and spoke of its healthy and dry soil, the beauty of its meadows, and its diversified woods, lawns, valleys, and hills, abounding with herds of thousands of cattle, guanacoes, wild hogs, wild fowl, guavas, cocoa-nuts, limes, oranges, and bread-fruit. Later navigators have not given its description in such glowing colours. Instead of valleys and lawns, the trees were thick and almost impenetrable, the land overgrown with a stubborn reed or rush, the climate insufferably hot, the water scarce and bad, the plague of fleas intolerable, and swarms of scorpions, centipedes, large black ants, and other venomous insects without number; all the refreshments, however, mentioned above could be obtained. Not a long time previous to Anson's visit the island had been depopulated by the Spaniards, and in 1819 there were not more than twenty inhabitants on it.

Sunharon roads[*] is the only anchorage for large vessels, and was formerly called Anson road; it is on the south-west shore of Tinian, abreast the village of Sunharon, which consists of half-a-dozen houses inhabited by about 20 persons who come periodically from Guam to kill the wild cattle, which are numerous. This road, however, being open to the westward, and the bottom full of pointed coral rocks, cannot be recommended as an anchorage, particularly between the months of June and October, during the season of the western monsoon. From the middle of October to the middle of June the weather is settled and the road secure. H.M.S. *Centurion* anchored here, however, from 27th August till the end of October 1742, about 1½ miles off shore, abreast a sandy bay, in 22 fathoms, on a bottom of hard sand and coral, with the two extremes of the island bearing N.W. ¼ N. and S.E. ¼ E. the centre of Aguijan S.S.W., the peak of Saipan seen over the northern part of Tinian N.N.E. ½ E., and a reef of rocks lying between the vessel and the shore E. by S. ¾ S. The anchoring bank is shelving, and free from danger, except a reef lying about half a mile off shore, and affording a narrow passage into the small sandy bay, which is the only place where boats can land.

Water may be obtained from an ancient well near the anchorage.

The channel between Tinian and Saipan is but little known, and should be used with great caution, if attempted at all.

SAIPAN ISLAND, three miles north-east of Tinian, is about 14 miles long in a N.N.E. and S.S.W. direction, and it may be recognised by its lofty peak, which has been estimated at 2,000 feet above the sea. This peak which is conical in form is an extinct volcano; about 2 or 3 miles northward of it is another extinct crater of considerable elevation The southern part of the island is flatter, forming an extensive grazing ground. The beach is bordered by trees among which the cocoa palm is conspicuous. The island was first inhabited by Caroline Islanders, who settled here between the years 1840 and 1850. It is generally visited[*] annually by three or four whalers, which anchor off its north-west side, outside a long reef extending in a southerly direction from the north-west part of the island towards the north part of Tinian; there is, however, a passage through this reef off the north-west part of the island, near a small island, with anchorage inside for several vessels. The inhabitants stated that there was no passage inside the reef (although it extends a long distance off shore from the south-west end of Saipan); but that there is a ship channel between the north end of Tinian and the south end of Saipan and reef.

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[*] *See* Admiralty plan :—Sunharon roads, on chart No. 1,101 ; scale, *m*=0·75 of an inch.

Garapan, the only village on Saipan, is on its north-west side. It is ruled by a man appointed from Guam, and inhabited by old and young settlers, and natives, and in 1876 contained about 700 persons. The natives for the most part are fine young men from the Caroline islands; they are quiet, and in a state of nudity, with the exception of a narrow slip of cotton round the lower part of their bodies. These people have cleared the greater part of the island, and have it well under cultivation; the men are also good sailors and pilots. There are also some convicts and a Spanish guard of about 50 men.

Anchorage.—During the season of the north-east trade winds a vessel may lie at the anchorage off Garapan, but during the south-west monsoon she will be in considerable danger. The *Narvaez* anchored in 14 fathoms (rock and sand), Mañgasa islet west point bearing N. 11° E., east point N. 14° E.; the principal house in the village, N. 68° E., and Tinian island (north-west point) S. 24° W.

A boat channel, which is buoyed with trunks of trees, leads from the anchorage through the reefs to the village. Vessel should not anchor with the village bearing northward of E. ½ N. The depths in the roads are 14 to 15 fathoms, coral bottom.

TANAPAG HARBOUR,[†] on the north-west coast of Saipan, between it and the island of Mañagasa, is formed by coral reefs, in the same manner as that of San Luis D'Apra, in Guam, which it approaches in size, but is free from the numerous shoals and reefs found at that port. It is sheltered from south-west winds; the channel leading in is narrow, and has several scattered rocky heads in it, rendering caution necessary, but when in the harbour, it is a snug and safe anchorage. Tanapag has not been examined closely, but is probably one of, if not the best anchorage in the whole of the Mariana islands.

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[*] Captain N. Vansittart, C.B., and John W. H. Harvey, Master R.N., H.M.S. *Magicienne,* July 1858.

[†] *See* Admiralty plan:—Tanapag harbour, on chart No. 1,101; scale, $m=0{\cdot}75$ inches.

MAGICIENNE BAY.[*]—H.M.S. *Magicienne*, on her passage from the Sandwich islands to Hong Kong, July 1858, having lost the N.E. trades in long. 156° 38′ E., and being short of fuel, steered for Saipan island, and anchored on its south-east side in Magicienne bay, in lat. 15° 8½′ N., long. 145° 44′ E.

This bay cannot be recommended to a sailing vessel, as the water is deep, and the anchorage so close to a coral reef bordering its shore, that with a southerly wind there would be no room to weigh. The depth is 30 fathoms, over coral with sandy patches, at only a third of a mile from the bluff at the head of the bay, decreasing rapidly to 3 fathoms close alongside the coral reef, which nearly dries at low water. The *Magicienne* anchored in 18 fathoms, with the south-west point of the bay bearing S. ½ E. about 2½ miles; the south-east point, which is a bluff, E.S.E. 1¼ miles; and a wooded bluff at the head of the bay, N.N.W. ½ W. nearly 3½ cables. When the vessel swung to the shore, there was a depth of 9 fathoms (the bottom being composed of coral patches) under her stern, and she was distant only one cable's length from the reef; at one cable southward of her anchor there was no bottom at 70 fathoms. The bay is well protected, being open only from E.S.E. to South. During the few days the vessel remained in it, the wind was light from the S.E. during the day, and at night a light air from the land between N.E. and N.W. The best place for landing is on the sandy beach eastward of the wooded bluff at the head of the bay.

Supplies.—There is no water at Saipan, except what is caught during the rains, and the rainy season is in August, September, and October. Cocoa-nuts, bread-fruit, and limes are plentiful; there are also many wild pigs and bullocks—the latter belong to the Spanish government. Pigs, poultry, and fruit can be obtained at the village of Garapan, on the west side of the island.

Wood grows on the shores of Magicienne bay, sufficient to supply any number of vessels, being for the most part the thickness of a man's body, white when cut, and in substance something between a bad ash and a poplar. The crew of the *Magicienne* cut down and brought on board 172 fathoms in six days, the wood growing close to the beach, and easily carried to the boats, which could lie afloat close to the reef.

The wood soon dried, but being freshly cut, it was necessary to split and bark it on board before using it for steaming purposes, also to use a small quantity of coal with it; the bark was very sappy. The wood being free of resinous substances, did not give out so much heat as might have been expected; three and a half fathoms of it being only equal to one ton of good Welsh coal.

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[*] *See* Sketch of Magicienne Bay on sheet No. 1,101; scale, $m = 2\frac{1}{2}$ inches.

Tides.—It was high water, full and change, in Magicienne bay, at 6h. 45m., and the rise was about 2½ feet.

Winds.—In the months of January, February, and March winds from N.E. to North prevail with violent rain squalls (churadas), veering in April to E. and E.S.E. with moderate weather when the wind hauls to the south of east. In the months of May, June, and July, the prevailing winds are from S. and S.W. with good weather and less rain although it is still abundant. From August to November it blows mostly from the West, with heavy rain interrupted by violent storms, the last two months being the hurricane season. In December the wind veers through N.W. to North and N.E.

FARALLON de MEDINILLA, or Bird island, about 50 feet high, is in lat. 15° 59½′ N., long. 146° 0½′ E., distant about 41 miles N.N.E. from the north end of Saipan. It is flat, barren, and with perpendicular sides, is 2 miles long N.E. and S.W., and its breadth is much less. It is of volcanic origin, and on its highest part there are vestiges of a crater, but the island is destitute of vegetation. On the south and west sides are some deep caverns or grottos. The south point is terminated by a small hill, which appeared to be joined to the island by a narrow neck of land.*

ANATAXAN ISLAND, 27 miles north-west of the Farallon de Medinilla, is about 5 miles long east and west, and rather more than 1½ miles wide; it has two high and steep peaks, which are volcanic, and have been seen in clear weather upwards of 40 miles.

The coast is everywhere steep and precipitous except on the south side, where there is a small sandy beach, and some projecting rocks form a small creek. There is no safe anchorage owing to the great depth until close to the shore; there may, however, be anchorage in some other part, as the island was inhabited when it was discovered by the Spaniards. Anataxan is covered with trees and bushes, amongst which is the cocoa-nut palm.

SARIGUAN ISLAND, to the N.N.E. and distant 18 miles from Anataxan, appears to be merely a high rock of the form of an upright cone, with nearly a circular base, 1½ miles in diameter. Its summit is rounded is well covered with vegetation, and seems to be of volcanic origin. It is uninhabited.

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* The *Narvaez* passed along both sides of this island, and this hummock was carefully looked for but could not be seen; the connexion was entire at every point, and all of the same height.

ZEALANDIA BREAKERS[*] (Piedras de Torres), were reported by the ship *Zealandia*, December 1858, when steering to pass between Sariguan and Guguan, observed two patches of breakers right ahead, distant about three-quarters of a mile. At 4h. 20m. Sariguan bore S. by W. ½ W. about 11 or 12 miles, when the breakers were in line with the island, and distant half a mile from the ship; this would place them in about lat. 16° 50′ N., long 145° 50′ E. The two patches, which at times broke heavily, lie N. by E. and S. by W. about a quarter of a mile apart, and have dark water between and around them. The wind was light and easterly, but the lateness of the day and the unsettled state of the weather did not permit a close examination. These rocks were on Espinosas' chart, but were expunged after the voyage of the *Uranie* in 1819, when Guguan was then mistaken for them and named Farallon de Torres, which name it retained until visited by the *Narvaez* in 1865. This shoal was not seen, but from information obtained from the natives its position is approximately correct. From the uncertainty of its position this reef should be passed with the utmost caution, for in fine weather it might not be seen until the ship was upon it.

GUGUAN ISLAND, lying northward about 36 miles from Sariguan, is a small island, 2½ miles long N.N.E. and S.S.W., about one mile broad, of moderate height, and much resembles the Farallon de Medinilla. Its north point is the lowest, but presents no facilities for landing, and it is perpendicular and unapproachable on all sides. The whole is covered with vegetation.

ALAMAGAN,[†] one of the highest islands in this archipelago, bears North, and is distant 16½ miles from Guguan. It is 2¼ miles long north and south, 1½ miles broad, and has two peaks, the highest of which is estimated to be about 2,316 feet above the sea. To the south and east the slope of the hills is extremely rapid, and the rock, which descends to the sea, is composed of lava and completely destitute of vegetation. On the north-east side of the island there is a large extinct crater, half a mile across; being on the slope of the mountain it is seen from seaward, and shows as a large elliptical opening below the north peak. When the island is seen, bearing between south and west, the interior of this immense extinct crater is fully exposed to view. The western side of the mountain is traversed from its summit to base by deep ravines, full of dark coloured vegetation, which is especially abundant in the lower parts of the ravines, causing the island when viewed from a distance to appear clothed in green in stripes. The north side is not quite so steep as the south. The highest point on the north side is a vast crater, from which large volumes of smoke have been seen to issue.

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[*] Mercantile Marine Magazine, September 1859, p. 284.

[†] *See* Admiralty plan :—Alamagan island, on chart No. 1,101; scale, $m=0{\cdot}75$ of an inch.

PAGAN ISLAND, about 25 miles North of Alamagan, is about 8 miles long N.E. and S.W., and 2½ miles broad. Its extremes being high with a valley between, it appears, when seen from a distance, like two or three separate islands. Pagan has three active volcanoes on it, one on its north-west, the others on its south-west end, the highest peaks being from 800 to 1,000 feet in height. Tropical vegetation, in spite of the volcanoes, reaches nearly to the summit of the two latter, but the sides of the former are nearly destitute of any. This island is celebrated among the Marianas on account of the treasure which was supposed to be concealed there.

Anchorage is bad, entirely rocky, with little or no shelter. The *Narvaez* anchored off the north-west coast, which, near the middle of the island, forms a small cove. There is a large rock on the beach, which when seen from seaward, appears like an islet. Landing is very difficult, as the surf breaks heavily on the steep beach in the finest weather. The southern shores are still more exposed than the northern, but anchorage probably might be found near the high pinnacle rocks lying off the south-east point.

AGRIGAN ISLAND, N. by W. ½ W. 41 miles from Pagan, is about 6 miles long N.W. and S.E., and 2½ miles broad, having on it two peaks, estimated to be about 1,400 feet above the sea. Agrigan is of volcanic origin, but presents no signs of an extinct crater;* the surface is covered with vegetation from the shores to summits, and the soil is very fertile.

Anchorage may be found on the south-west side of this island in front of a small sandy beach, the only one in the island. The anchorage is very limited, as the rest of the coast is steep-to near this bank, and has from 16 to 11 fathoms sandy bottom, the former depth being obtained at about 4 cables from the shore. The *Narvaez* anchored in 11 fathoms with the S.W. point of Agrigan bearing N. 24° W.; South point of the same island S. 64° E. Landing is very difficult owing to the steepness of the beach and the heavy surf.

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* Capt. Knorr, of the German corvette *Hertha*, visited this island, and says "luxuriant tropical vegetation covered the two volcanoes up to their smoking craters."

Supplies.—The *Narvaez* left on the island numerous animals of various kinds, and vessels will find furnished huts and outbuildings, domestic animals, &c., &c., besides pigs, goats, fowls, &c.

Cocoa-nuts, plantains, and other tropical fruit are in abundance.

ASSUMPTION ISLAND, called also Asuncion, is 54 miles N. by W. from Agrigan. It is a remarkable object, being a perfect volcanic cone rising abruptly from the sea to the height of about 2,850 feet. At its summit is a large crater, and it is probably not extinct; the sides of the mountain are covered with ashes a considerable distance down; the remainder is covered with lava, which has formed in its course steep ravines. These are bordered with a few stunted cocoa-nut trees very scattered, and thick impenetrable underwood.

Anchorage.—La Pérouse anchored at this island in 30 fathoms, but the *Narvaez* could find no bottom at this depth anywhere round the island. In clear weather both this island and Agrigan can be seen about 45 miles off.

URRACAS ISLANDS are a rocky group lying N.N.W. ½ W. 22 miles from Assumption, in lat. 20° 7′ N., long. 145° 20′ E. They consist of three islets, of which the western is the largest, and that to the north-east the smallest; are tolerably high, very jagged, and form a circle of about 2 to 3 miles in diameter, enclosing a space of water not unlike that formed by a coral island. The group presents the appearance of being a conical volcano the summit of which has fallen in.

The lines of the shores of these islands are nearly as possible in the circumference of a circle, and the islets are joined by reefs, the outer face of the whole being steep-to, and presents no known danger outside them. The group is devoid of vegetation, excepting a little moss near the summit of the western islet.

FARALLON DE PAJAROS, the northernmost of the Mariana group, 1¼ miles long east and west, and 1¼ miles broad, lies in lat. 20° 32′ 27″ N., long. 144° 53′ 47″ E. Its summit at the west end of the island forms a regular cone of ashes of a brownish-gray colour (on a base of black lava), about 1,039 feet in height, and is an active volcano. The north, south, and east sides are perpendicular, with no known off-lying dangers. A large rock connected to the island lies on the south-east side, and farther southward are several smaller rocks, one of which is conspicuous. On the south-west side there is also a rock resembling that to the south-east. The island is precipitous on all sides except the west, where the mountain slopes more gradually, but there is no appearance of a bank off this side, and it may be approached within a mile. The island is barren, except on the south shore, where there are a few trees and some scant vegetation. It is not known if anchorage may be obtained.

LOS JARDINES or Marshall islands.—Two small islands in lat. 21° 40′ N., long. 151° 35′ E., were discovered by Captain Marshall of the ship *Scarborough* in 1788, and are thought to be the same as Los Jardines of Alvaro de Saavedra, in 1529. Nothing, however, is known of them beyond the most vague rumours.

MARCUS or WEEKS ISLAND was reported by Capt. Gelett in 1864, and by several later authorities. The island is about 5 miles long, low, sandy, and covered with trees and shrubs. A knoll near the centre rises about 200 feet above the sea, and a reef extends to the north of the island.* Commander Belknap, of U.S.S. *Tuscarora*, 1874, describes this island(which he places in lat. 24° 14′ N.,long. 154° 0′ E.) as being only 60 feet in height, and with extensive reefs projecting from both its eastern and western points. Weeks and Marcus islands are probably identical.

EUPHROSYNE REEF has been several times reported, and the positions assigned to it all agree so nearly as to leave little doubt of its existence, it is placed on the charts in lat. 21° 43′ N., long. 140° 55′ E., but this position requires to be verified.†

PARECE VELA or DOUGLAS REEF, discovered Sept. 1789, by Captain Douglas, is in about lat. 20° 31′ N., long. 136° 6′ E. It is described by Mr. Sproule, of the ship *Maria*;‡ who partially examined it in his boat, March 1848, as being a narrow perpendicular belt of coral, enclosing an oblong lagoon of water, with heavy breakers rolling over its north and north-east sides. The boat rowed under the lee of the reef, its whole length, which is only 2 miles; and three-quarters of a mile wide at one-third from the eastern point. Sharp heads of coral appeared frequently through the surf, and one isolated rock, about 15 feet high and 15 feet long, rose from the smooth water lagoon near its western extreme. The rock when first seen from the vessel, about 3 miles off, appeared like a boat's tanned lug-sail. The reef, from its being visible only a short distance off, should be carefully approached, especially in dark and blowing weather. Sperm whale and fish of different descriptions were abundant. This reef should be approached with great caution as in the winter season when stormy weather prevails it can be seen only when at a short distance.

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* From the report of Captain Gelett of the ship *Morning Star*.

† Unsucessfully searched for by U.S.S. *Alert*, 1881.

‡ Nautical Magazine, 1848, p. 242.

Britomart reef, placed on the charts in lat. 19° 8′ N., long. 141° 35′ E. was reported by the ship *Britomart* in 1869, as being level with the water, and from 400 to 500 feet in length.*

LINDSAY ISLAND was discovered by Mr. Lindsay of the British schooner *Amelia,* December 1848, in lat. 19° 20′ N., long. 141° 15½′ E. It appeared about 40 feet high, 4 miles long, and very barren.†

VOLCANO ISLANDS, three in number, were discovered in 1543, by Bernard de Torres, and received their name from the volcano on the central island. There is no doubt of their being the same as the Sulphur islands of Captain King in 1779. They were also seen by Krusenstern in 1805. The southern island is named San Augustino, the centre Sulphur island, and the northern San Alessandro.

San Augustino, the summit of which is in lat. 24° 14′ N., long. 141° 20′ E., is a single hill of a square form, flat at the top, about one mile in extent, and 3,039 feet high.

Sulphur island is about 5 miles long E.N.E. and W.S.W., and its centre is in lat. 24° 46′ N., long. 141° 19′E. The south point of the island is a barren hill, flattish at the top, 644 feet in height, and when seen from the W.S.W., presents the appearance of being an evident volcanic crater. A low narrow neck of land connects this hill with the north end of the island, which spreads out into a circumference of 9 or 12 miles, and is of moderate height; and smoke or steam was noticed issuing from the ground on this part of the island. The part near the isthmus has some bushes on it, and a green appearance, but that to the north-east is barren and full of detached rocks, many of which are white. Dangerous reefs extend 2½ miles to the east and 1½ miles to the west from the middle part of the island, but there is a clear passage between the island and the reef on the east side. Three-quarters of a mile from the south-east side of Sulphur island is a depth of 100 fathoms lava bottom.

San Alessandro, the northern island is about 2,500 feet in height, 2 miles in length north and south, and one mile broad, and when viewed from the southward appears as a single mountain; and its peak or crater, which is of a conical shape, is in lat. 25° 24′ 54″ N.; long. 141° 15′ 45″ E. Landing may be effected on the south-west end. The island is steep-to on its northern and eastern sides but a depth of 40 fathoms is found at a mile from its south end. Soundings of varying depths are also obtained on its western side where the bottom appears to be very uneven.

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* Unsuccessfully searched for by U.S.S. *Alert,* 1881.

† The *Britomart* reported having passed over the position assigned to Lindsay island without seeing it.

Submarine volcano.—At $1\frac{8}{10}$ miles W. $\frac{1}{4}$ N. from the north end of San Alessandro a submarine volcano was observed by the United States war vessel *Alert* in 1880. Masses of mud and ashes were being upheaved, accompanied by dull reports, and a strong odour of sulphur. Depths of 10 to 20 fathoms are found at half a mile south of this reef or island in process of formation, and there is a patch of 5 fathoms $7\frac{1}{2}$ cables south-east from it. At night flames were noticed issuing from the volcano.

The *Alert* revisited the site of this volcano in May 1881. At this time it was not in action, but the position was marked by a crescent-shaped patch of discoloured water three-quarters of a mile long.

SEBASTIAN LOBOS (Grampus Islands).—The Grampus group, discovered by Captain Meares, in April 1788, consists of three islands, two of which are close together, and the third to the south-west of them. The south-west island is assumed to be in lat. 25° 10′ N., long. 146° 40′ E. The Sebastian Lobos, with which these are supposed to be identical, are nearly in this latitude. Meares does not give their position, but Krusenstern places them from his track in lat. 25° 40′ N. Another island of this name is inserted on the chart in lat. 25° 40′ N., long 153° 55′ E., and is probably taken from the old Spanish charts. Its existence is exceedingly doubtful.

Tree island, placed on the charts in lat. 26° N., long 146° 15′ E., is not otherwise known.

The MALABRIGOS or Margaret islands, in lat. 27° 20′ N., long. 145° 45′ E., are a group of three islands seen in 1773 by Captain Magee. They have been considered to be the Malabrigos islets (bad shelter) of Bernard de Torres in 1543, and their position requires to be verified.

ARZOBISPO or BONIN ISLANDS were formally taken possession of by Captain F. W. Beechey, H.M.S. *Blossom*, in June 1827, and at that time showed no signs of ever having been inhabited. They consist of three groups or clusters, viz., Bailey group to the south, Beechy group in the centre, and Parry group to the northward, the whole extending in a N. by E. direction from the parallel of 26° 30′ to 27° 50′ N. The climate is excellent, and the soil productive. The first settlement was made by emigrants from the Sandwich Islands in 1830, and in 1853 there were a few whites and Sandwich islanders, 36 in all, settled on Peel island. The Japanese are said to have visited the Bonin islands in 1675, and the Japanese Government assumed the sovereignty of these islands in the year 1877. There are still some British subjects residing there, and the language spoken by the old inhabitants is English.

BAILEY GROUP were first visited by Mr. Coffin, in 1823; they were named by Captain Beechey in 1827. A reconnaissance of these islands was made in 1857 by the American squadron.

HILLSBOROUGH ISLAND (the largest of the group) is 7½ miles long N.N.W. and S.S.E., 1¼ miles wide, 1,471 feet high, and the greater part hilly and rocky. There are some wild hogs upon it, fish is abundant, and turtle in the season.

Off the north point and north-west points of the island dangerous reefs and rocks extend to seaward some distance.

New-port* on the south-west side of the island is 2 miles wide from the main to Plymouth island, which it fronts and partially shelters. The harbour is deep in the centre.

With the exception of New-port, in lat. 26° 36′ N., long. 142° 9′ E., and a small cove just northward of it, there is no place on the shores of any of the islands suitable for a coal depôt, nor can New-port or the cove be recommended as places suitable for such a purpose. They are both open from S.W. to N.W. and the holding ground is not good, being sand and rocks; vessels could, however, always get to sea on the approach of a gale. The *Plymouth* anchored in 14 fathoms about half a mile from the head of the port.

From the south-west point of the island a continuous line of reefs and islets (terminated by a narrow island) extend to a distance of 2½ miles.

Kelly island lies to the south-east 3 miles from Hillsborough, and is one mile long and half a mile wide.

Perry island lies 2 miles to the westward of Kelly island, and is 1¼ miles long and half a mile wide: a rocky patch lies three-quarters of a mile to the south-eastward of Perry island.

Supplies.—Both wood and water may be procured, the latter from a small stream near the head of the cove to the northward of the anchorage.

Tides.—It is high water at New-port, full and change, at 11h. 32m., and the rise of tide is 3½ feet.†

BEECHEY GROUP‡ consists of three islands, of which Peel island, the largest and most southern, is 4¼ miles in length. The northern island is named Stapleton, and the centre one Buckland; they rise almost perpendicularly out of the sea, and their black and wall-like rugged cliffs and low vegetation, present a very rough and inhospitable aspect. This group is 9¼ miles in length, and is divided by two channels so narrow that they can only be seen when abreast of them. Neither of them is navigable; the northern on account of rocks, which render it impassable even for boats; and the other on account of rapid tides and currents, which, as there is no anchoring ground, would drift a ship on to the rocks.

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* *See* Admiralty plan :—New-port, on sheet of plans No. 1,100; scale, $m = 0 \cdot 75$ of an inch.

† Lieutenant Balch, U.S. ship *Plymouth.*

‡ The Japanese have annexed these islands.

PEEL ISLAND is 4½ miles long, and about 890 feet high; its origin evidently is volcanic, the hills being well wooded and watered: this island was first inhabited in 1830 by emigrants from the Sandwich islands, and in 1876 the population numbered 66. Tidal waves are not uncommon at port Lloyd in Peel island, the water sometimes suddenly rising some 7 or 8 feet. This phenomenon is probably due to volcanic action.

Knorr island lies off the south-west end of Peel island, and has several rocks and islets in its vicinity.

Sail rocks, 60 feet high, lie to the northward of Knorr island.

PORT LLOYD is a small harbour on the west side of Peel island, the bleak shores of which are steep and lofty, but in the ravines there is luxuriant vegetation, and in the larger valleys good pasturage. The entrance to the harbour, though not easy of access, is well defined and can scarcely be mistaken. Peel island, as well as those surrounding it, is chiefly visited by whale ships.

Southern head is the sea face of a bold island 492 feet high, on the south side of the entrance to Port Lloyd. A beacon, 20 feet high, surmounted by an open triangle has been erected on the slope of Southern head.

Shoals.—Shoals extend fully 3¼ cables S.S.E. from the eastern point of Square rock, 260 feet high, lying off the northern point of entrance. The centre shoal is awash, with a smooth sea.

Horton shoal, a detached patch of 9 feet water, lies 3 cables S.S.E. from the east end of Square rock; it is the southernmost of the shoals extending southward from Square rock.

South shoal.—A coral rock, with 8 feet water on it, lies about a cable northward of Southern head.*

Supplies.—Potatoes, yams, and other vegetables, fruits of various kinds, together with wild hogs and goats, can be procured from the few whites and Sandwich islanders settled at port Lloyd. Since the islands have been under Japanese rule attention has been paid to the cultivation of coffee, cotton, rice, and barley. Wood is plentiful; and water can be procured, though in limited quantities, and slightly tainted by the coral rocks from which it springs. The best watering place is in Ten-fathom hole; but it will be necessary to be cautious of the sharks, which are very numerous. Quantities of turtle are taken during the season (January to March.)

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* *See* Admiralty plan:—Port Lloyd, No. 1,100; scale, $m = .4$ inches. In this plan the longitude of Ten-fathom hole is given as 142° 11′ 30″ E. The Master of the U.S. ship *Susquehanna* gives the longitude 5′ farther East. In a meridian distance measured from Hong Kong with 5 chronometers, interval 33 days, Collinson, in 1852, made the longitude of port Lloyd, 142° 15′ E., assuming Hong Kong as 114° 10′ 48″ E.

Directions.—Steer boldly in for the Southern head, taking care when approaching from the southward, not to bring it to bear northward of N.E. ¼ E., nor shut it in with two paps (879 and 886 feet high), on the north-east side of the harbour, and which will be seen nearly in line with it on this bearing. In this position they are a safe leading mark; to the southward of this line there is broken ground. The west end of Goat island (north of the entrance) in line with the west end of Square rock, leads westward of the shoals south of Square rock.

Castle rock (87 feet high) within the harbour, bearing East, leads in.

If the wind be from the southward, which is generally the case during the summer season, a sailing vessel should round the Southern head, at the distance of about a cable, close to the sunken rock, which will be distinctly seen in clear weather. Keep fresh way upon the vessel, in order that she may shoot through the eddy winds, which baffle under the lee of the head, and to prevent her coming round against her helm, which would be dangerous. She will at first break off, but will presently come up again; if not, be ready to go about, as the vessel will be close upon the reefs to the northward, and the helm must be put down before the south end of the island, off the port to the north-westward, comes on with the west side of Square rock.

If the vessel comes up, steer for the high Castle rock before mentioned, at the eastern part of the port, until a pointed rock (white on top with bird's dung, and looks like an island) on the sandy neck eastward of the Southern head comes in line with a high sugar-loaf-shaped grassy hill southward of it; after which bear away for the anchorage, taking care not to open the sugar-loaf again to the westward of the Pointed rock.

In anchoring, taking care to avoid a spit extending off the south end of the small island near Ten-fathom Hole, and not to shoot so far over to the western reef as to bring a rock at the outer foot of the Southern head, in line with some black rocks, which will be seen a short distance to the south-westward. The depth will be 18 to 20 fathoms, clay and sand. The anchorage is fair, though open to the south-west.

If the wind be from the northward, turn to windward between the line of the before-mentioned sugar-loaf and Pointed rock, and a north and south line from the Castle rock. This rock, on the western side, as well as the bluff to the northward of it, may be passed close to, if necessary. The hand lead will be of little use in beating in, as the general depth is 20 or 24 fathoms.

Anchorage. — Port Lloyd is safe and commodious although the water is deep, vessels usually anchoring in 18 to 22 fathoms. The best position is as high up the harbour as the vessel can go, so that she has room to swing and veer cable. Vessels can also moor in Ten-fathom hole.

Tides.—It is high water, full and change, at port Lloyd at 6h. 8m., and springs rise 3 feet.

FITTON BAY,* at the south-east angle of Peel island, is 1¼ miles deep and nearly a mile wide at its entrance, and is enclosed by perpendicular rocks; this bay affords good anchorage, in 17 fathoms, sandy bottom, but is open to the S.E., and as the winds from this quarter blow generally during summer, it will be prudent not to anchor there during that season. On the north side of the entrance there is a large islet connected with the north bluff of the bay by a reef, and to the southward of the entrance lie some sunken rocks; ships should therefore not close the land in that direction so as to shut in the paps (at the north-east angle of port Lloyd) with the south bluff of the bay.

BUCKLAND ISLAND lies to the north of Peel island, and is 3½ miles long N.W. and S.E.; Walker bay, a small sandy bight, on its south-west side affords good anchorage, but vessels must be careful in bringing up to avoid being swept out of soundings by the current. An island connected to the main by a reef lies on the west side of this bay. Deer are said to be found here.

Goat island, in lat. 27° 7′ N., lies off the west entrance to the channel between Peel island and Buckland island (the centre of the Beechy group); it is about 300 feet high, and is surrounded by rocks and islets.

Little Goat island lies to the westward of Buckland island, and a little over half a mile to the north-east of Goat island above mentioned, and is connected to the main by a reef.

STAPLETON ISLAND, the most northern island of the Beechey group, is also of volcanic origin, its surface is hilly, interspersed with large tracts of fertile land.

There is a small bay on the western side, which appears to be deep, surrounded by rocks, and the mountains here rise from 800 to 1,500 feet in height; a small promontory divides the bay, and on the land bordering the north part is a spring of capital water which issues from a rock.

Supplies.—There are a great many goats which have become wild, and the same supplies may be procured as at Peel island.

Kater island, in lat. 27° 30′ N., long. 142° 15′ E., lies in the channel between the Beechey and Parry groups. It is about 1½ miles long N.W. and S.E., and is surrounded by rocks in every direction.

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* *See* Admiralty plan:—Fitton bay, on sheet No. 1,100; scale, *m*=4·0 inches.

PARRY GROUP.—The northern cluster is composed of small islands and pointed rocks, and has much broken ground about it, which renders caution necessary in approaching it. They extend 9 miles in a N.E. by N. and S.E. by S. direction, between lat. 27° 37′ N. and lat. 27° 45′ N., the largest island being in long. 142° 8′ E.

CAUTION.—When in the vicinity of the Bonin islands, the navigator must exercise considerable caution, as the currents both in direction and force (especially between the islands) are uncertain. *See* page 11.

ROSARIO or DISAPPOINTMENT ISLAND, in lat. 27° 16′ N., long. 140° 51′ E., and about 70 miles W. by N. from Peel island, is small, being only about one mile long, east and west, and its highest part 148 feet above the level of the sea. It is rugged, apparently unsusceptible of cultivation, and surrounded by numerous isolated rocks. The surf breaks heavily all around it, and landing is impracticable.

Abreojos.—A shoal inserted on the charts, in lat. 22° 0′ N., long 129° 15′ E., and which appears on the old Spanish charts, is not otherwise known. An island was reported by a whaling vessel as being near this position, but has not since been seen. It is however probable that the island or shoal exists, but its position is very uncertain.

RASA ISLAND, seen by the French frigate *La Cannonière* in 1807, and by the Spanish frigate *Magellan* in 1815, is in lat. 24° 28′ N., long. 131° 26′ E.,* about 2½ miles long N.E. and S.W., low, its highest part being about 150 feet above the sea, covered with short brushwood, and surrounded with rocks. The shores are steep, particularly on the northwest side, where the sea breaks heavily.

Dolores island, placed on the charts in lat. 24° 50′ N., long. 134° 15′ E., is in nearly the same position as an island reported and named Kendrick island, and described as being low and about 6 miles in length; it is not otherwise known.

Bishop rocks, in lat. 25° 20′ N., long. 131° 15′ E., were discovered by Captain Bishop, in the ship *Nautilus*, in 1796, but they do not appear to have since been seen.†

BORODINO ISLANDS.—These two islands lie in a N.N.E. and S.S.W. direction from each other, distant about 5 miles. The southernmost, the centre of which is in lat. 25° 52¾′ N., long. 131°

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* This island has been reported by numerous vessels, the positions given by them agreeing fairly. The above position (20 miles eastward of that formerly assigned it) is from the observations of Capt. Knorr, of the German corvette *Hertha*, 1876.

† Lieutenant Rodgers, U.S. Navy, passed over this position and saw nothing of these rocks.

12¼′ E., is the largest, about 4 miles in extent east and west, low, of coral formation, covered with vegetation, and has a reef extending along its south shore, affording no visible harbour. The north island is 3 miles in length, also flat, but has a rise near the north end gradually sloping towards the sea.

CAUTION.—The mariner, when navigating the space described between Formosa and the Mariana and Bonin islands, should use extreme caution when approaching the locality of many of the islands and shoals marked on the chart, especially at night, or during dark and hazy weather, for the existence, or at least the positions, assigned to some of them appear to be very doubtful.

MEIACO SIMA, LIU-KIU, AND LINSCHOTEN GROUPS.

These groups form a chain of islands extending in an easterly and a north-easterly direction from Formosa to the southern extremity of Japan, and lie between the parallels of 24° N. and 31° N.

MEIACO SIMA or YAYEYAMA GROUP.*—This group is the westernmost of the chain, and lies between the parallels of 24° 0′ N. and 25° 6′ N., and the meridans of 122° 55′ E. and 125° 30′ E.; it may be divided into two clusters, Pachung-san and Tai-pin-san, with the outlying islands of Kumi and Chung-chi. The whole group is clothed with vegetation, the soil is good, and horses and cattle are in abundance; the people, however, are not very enterprising. These islands are subject to the chief of the Liu-kiu group.

KUMI ISLAND, about 700 feet high, is composed of coralline limestone, all its ranges are capped with trees and brushwood, but excepting the pine fir, which contains a great portion of resin, none attain any size. There are four villages on the island, one on the west, and two on the north side, one of which is inland, in a basin-shaped valley. The principal town and port is on the north side, in which were several junks of about 50 tons riding at anchor; but the entrance from the sea is so narrow and shallow, that ingress and egress can only be effected at spring tides and with very smooth water. Temporary anchorage, in fine weather, may be found on a sandy ledge northward of the town.

Chung-chi island is a high uninhabited cluster of rocks, with dangerous patches extending between it and the south-west point of Ku-kien-san.

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* *See* Admiralty plan:—Meiaco sima group, No. 2,105; scale, $m = 0{\cdot}5$ in. The description of this group is chiefly from the voyage of H.M.S. *Samarang,* by Captain Sir E. Belcher.

Boudrouet rocks, placed on the chart in lat. 24° 10′ N., long. 122° 33′ E., were reported by M. Boudrouet, of the French vessel *Roebur* as being a group of rocks 65 feet high, perpendicular on all sides, broken in two or three places, their summits being of uniform height, and the whole being about 100 yards in length.

A dangerous shoal,[*] 3 miles in extent, E. by N., and W. by S. is said to lie about 10 miles N.W. by W. from Kumi island.

Another shoal is inserted on the chart as lying S.W. by W. about the same distance from the same island; and though its existence is doubtful, great caution should be used when in this vicinity, as the numerous patches between the Meiaco Sima group leaves still a probability of its existence.

PA-CHUNG-SAN GROUP consists of ten islands, the nearest being 32 miles to the eastward of Kumi. Five only are at all mountainous, the remainder are flat, like the coral islands, and similarly belted with reefs, such as connect this group. The principal islands are Ku-kien-san (Nishiomote sima), and Pa-chung-san (Ishigaki sima), which afford several commodious harbours. Port Haddington, and Ishigaki harbour, on the west side of the latter island, would shelter a large number of vessels, but it abounds with coral patches, rising suddenly from 10 or 15 fathoms almost to the surface; in clear weather all those having as little as 5 fathoms are clearly discernible, and therefore easily avoided. Except on the northern side of Ku-kien-san and the latter port, watering is difficult, as reefs extend a great distance from the mouths of the streams.

KU-KIEN-SAN ISLAND (Nishiomote sima) is 15½ miles long and 12 miles broad, and its highest peak is about 2,000 feet above the sea.

With respect to the various harbours of Ku-kien-san, there are two or three adapted for shelter for small vessels, or even those drawing 18 feet, where a refit might be accomplished in still water in any monsoon, or where steam vessels might lie safely for the purpose of obtaining wood; and there are two other open bays, well sheltered in the N.E. monsoon, admirably adapted for watering; but there is not any other inducement to visit this island. All the dangers are well marked by the coral fringe which extends about a cable from the outline.

Hatoma sima, a small island, lies 2½ miles to the northward of Ku-kien-san, it is about 40 feet in height, and encircled by a reef.

Ports Gage, Herbert, and Cockburn (Oyoshi minato) are on the west side of the island.

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[*] Reported by Mr. Whittingham, of the British ship *Helen Stewart*, 1843.

Seymour bay, at the south-west angle of Ku-kien-san, has a stream (Shika no gawa) which enters the sea in deep water, and a vessel might be moored sufficiently close to lead the hoses from the pumps into her without the intervention of boats and casks.

HASYOKAN (Sandy island or Namiteruma sima) about 14 miles south-east of Chung-chi, is 3 miles long, east and west, and has a few trees and huts on it. Reefs appear to extend about a mile off the shore all round it, and there is said to be no safe channel between this island and Chung-chi.

Koubah (Ko hama), **Roberton, Baugh, Inglefield, and Loney islands** are on the reef connecting Ku-kien-san with Pa-chung-san, the latter island being also connected, by numerous reefs, with Hasyokan.

PA-CHUNG-SAN ISLAND (Ishigaki sima) is very irregular in outline, terminating to the north-east in a narrow peninsula 11 miles in length, the extreme north point of which is Adams point (Hirakubo saki) in lat. 24° 38′ N., long. 124° 20′ E. Every part of the island is fringed by a coral reef, and it is connected to the above-mentioned islands by a plateau of coral. Its highest part near the centre of the peninsula is 1,700 feet, and there are two other peaks of 1,500 and 1,200 respectively, the last-mentioned being near Adams point. The ports are port Broughton on the south, and port Haddington and Ishigaki harbour on the west side of the island.

PORT BROUGHTON,* **or Miayoshi minato,** a snug little anchorage (safe only, however, during the N.E. monsoon) is open to the southward, and affords only space for small vessels between the reefs which extend a considerable distance from the shore. Port Broughton is only useful as a port of refuge with still water in case of disaster, when a disabled vessel could not reach the more secure anchorage of port Haddington.

Directions.—Approaching from the westward, as Chung-chi is neared, Hasyokan (Sandy island) will soon be seen, and avoiding the space included northerly of a line between Chung-chi and it, a vessel may safely stand on, passing within one mile of the southern limit of Hasyokan, and work for the south-west angle of Pa-chung-san, avoiding the reefs, which extend from it in a direct line N.E. and S.W. to Hasyokan. A high rock, named South rock, will point out the outer reefs of Pa-chung-san. The dangers between it and Pa-chung-san must be avoided by eye, the shoals being visible in 5 or 6 fathoms, and the sea breaking upon those of 2 and

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* *See* Admiralty plan :—Port Broughton on chart No. 2105 ; scale, $m = 2 \cdot 25$ inches.

3 fathoms. The opening in the reef is in the heart of a deep indentation just northward of the low south-west point of the island, and it has apparently a centre bar. The right-hand opening is the proper one.

From the eastward there are no dangers which are not clearly visible. After making the land, edge along the southern and eastern breakers until the abrupt turn of the breaker line is seen, at which moment the extreme south-west point of the bay will open. The breakers have regular soundings off them, but the course in will probably lead in 7, 8, or 9 fathoms, deepening to 14 or 15 off the inlet. As the breeze generally blows out, it will be advisable to send a boat to find clear ground off the opening, and shoot up and anchor; the vessel may then be warped in. If, however, the ships stay is to be short, the outer anchorage appears good.

Supplies.—Neither wood nor water can be conveniently procured.

PORT HADDINGTON.—No safe anchorage is to be met with between port Broughton and port Haddington, which last is on the west side of Pa-chung-san; although during the S.W. monsoon there are several good bays on the northern side of the island, where anchorage might be found, but they are certainly not adapted for refitting.*

When rounding the north-eastern extremity of Pa-chung-san the two low coral islets of Mitsuna and Tarara ought to be avoided at night, but the dangers by day are clearly denoted by breakers. To the northward of these islets the ground is foul, and the *Samarang* was compelled to tack to the westward in 7 fathoms, at least 10 miles north of them.

Proceeding from port Broughton to port Haddington, after rounding the north-east end of the Pa-chung-san breakers, and running to the westward the length of the island, haul close round the north-west angle, and edge along southerly within about one mile of the breakers. The port will then open out, into which, with the prevailing breeze of the N.E. monsoon, it will be necessary for a sailing vessel to beat. Off Hamilton point (the north point of the port) will be seen a remarkable little rocky hummock upon which was left a large pile of stones. The bottom, for more than a mile off the point, is rocky and dangerous; but all the dangers of this port are visible from aloft. The inner parts of the ports have numerous shoals, but there is still sufficient good anchorage, where a vessel will be land-locked.† The *Samarang* anchored about a mile or less within Hamilton point, in 10 fathoms, clear bottom.

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* There is a passage from port Haddington into port Broughton, which was used by H.M. Ships *Lily* and *Contest*, but it abounds with coral reefs.—Commander the Hon. J. W. S. Spencer, *H.M. Sloop Contest*, 1852.

† Two rocks were reported by Lieutenant Luard, R.N., but he gave no marks for determining their position.

From the westward port Haddington may be sought and reached more expeditiously by working up on the north-west side of Ku-kien-san, rounding Isaac island (Hatoma sima) and running down off the danger line from Melros point round the reef, which extends one mile off Hamilton point, and shoot into 15 fathoms. The chart exhibits several awkward patches, but a vessel can thread her way between them, if the sun be bright, as all the shoals may easily be traced from aloft.

This is a most convenient port during the N.E. monsoon; there is, however, a long fetch for the sea with a S.W. gale, and in that season typhoons are said to be very violent about this region.

Hamilton point is in about lat. 24° 25′ N., long. 124° 6½′ E.

Supplies.—A convenient watering place was established by sinking a cask and suspending the suction hose over it, so as to prevent the sand from being sucked in. The stream from above was regulated by dams to ensure not more than a sufficient supply, by which means the water obtained was beautifully clear; the process however is not easy as the streams are difficult of approach at low water, and at high water they are brackish. Wood is abundant, and the position is farther preferable by being so far from the villages as to prevent the authorities from feeling alarmed. Sufficient fire-wood was cut at Tamanu beach to fill the ship, and trees were obtained of pine and other woods adapted for plank.

Tides.—It is high water, full and change, at port Haddington at 6 hrs. 45 min.; springs rise 7 feet.

ISHIGAKI HARBOUR, is a safe and commodious anchorage on the southern shore of Pa-chung-san, between it and the reefs which connect the island with Roberton island (Taketomi sima) and which extend from it westward to Ku-kien-san. The anchorage is open to the north-west and probably is therefore not so sheltered as port Haddington.

Tarara and Mitsuna islands, situated between Pa-chung-san and Tai-pin-san, are surrounded by reefs and are very dangerous; these reefs are said to be connected with the Providence reef.

TAI-PIN-SAN GROUP.—The eastern cluster is composed of several islands, viz., Tai-pin-san, Kurimah, Yerrabu, Coruma, and Hummock island,* all of which are connected to each other by extensive coral reefs. The reefs do not project far westward from Kurimah unless in patches unconnected with the main belt. Off Yerrabu they extend 3 or 4 miles, but close towards its north-western angle a deep water channel admits vessels within the belt up to Hummock island, and into the main harbour of Tai-pin-san.

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* These names are from Admiralty chart No. 2,105; Sir E. Belcher, in his Voyage of the *Samarang*, names them thus—Ty-pin-san, Ku-ri-mah, Yed-rap-boo, Ykima, and Ogame.

Providence reefs.—The reefs again jut out on the south-west angle of Coruma, and sweep northerly as far as the eye can reach (from 100 feet elevation) round to east in a continuous line of breakers, edging in towards the south-east extremity of Hummock island; and it was on this reef that H.M.S. *Providence*, Captain Broughton, was wrecked in 1797. A high patch of rocks lies on the north-east angle of this outer belt, probably 10 miles from the northern point of Tai-pin-san.*

Anchorage.—Safe anchorage may be found during the south-west monsoon inside the reefs of Hummock island, and this position is also safe in the other monsoon, but for a sailing vessel the passage in or out at the latter season would be attended with risk, as besides the numerous patches of rocks, sudden squalls and gales are of frequent occurrence. The southern coast, from the south-east breaker patch to the south-west anchorage, does not present many dangers, if a good look out be observed; the reefs not extending more than half a cable from the shore.

Supplies.—There can be no inducement for a vessel to visit Tai-pin-san. Neither wood, water, or any other necessaries could be procured excepting in the smallest quantity; and this would hardly warrant the risk on such a dangerous coast.

Directions.—Great caution is requisite in approaching the Meiaco-Sima group from the north-east, or south, particularly with fresh breezes, and in the absence of the sun, by the aid of which reefs below water can be detected. They are, from their greenish hue, being covered with seaweed, less distinct than at other places, and therefore are, perhaps, not all marked on the chart. The lead will not afford timely warning.

Approaching the group from the south-west, the island of Ku-kien-san from its great height will be first distinguished, presenting a round-backed summit closely clad with trees; knolls occur, elevated 2,000 feet above the sea, but as they seldom present the same appearance, owing to those nearer the coast eclipsing them, their accurate measurement could not be obtained; Adam peak, which may be noticed on the south-eastern outline was determined to be 1,200 feet. As the island is neared, the high rocky basaltic island of Chung-chi will show out when the western limit of Ku-kien-san bears N.E. by N., and working for this islet no danger can be feared, and should night set in, all the space on the north-west of Ku-kien-san up to the island of Kumi is safe.

The *Samarang* entered the group from the westward, passing within 2 miles of the southern reefs or breakers off Hasyokan, and standing on close hauled to the eastward, intending to make Ykima, and beat up from it to Tai-pin-san. On the morning following, not seeing Ykima (which is supposed not to exist), and the weather being very boisterous, she stood on to the westward to get under the lee of Pa-chung-san, and endeavoured to reach some place of shelter. On nearing the latter island, she ran down the eastern and southern side, to the south-western extremity of its reef.

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* This reef is said to be of less extent than is shown on the charts.

Here was a barrier of breakers as far as the eye could reach from the mast-head, and apparently connecting Hasyokan island with the group of larger islands. An opening, however, was found into the reef, and after due examination the vessel was shot up into 13 fathoms, into Port Broughton, and warped into a snug position, where she was moored with just sufficient room to swing, the depths up to the coral ledges varying from 13 to 7 fathoms.

PORT HADDINGTON to TAI-PIN-SAN.—After quitting port Haddington the *Samarang* worked to the northward, and endeavoured to weather the two low coral islets, Mitsuna and Tarara. She had passed the breakers, leaving them about 5 miles under her lee, when finding the depths decrease to 7 fathoms, the vessel was immediately tacked, and stood to the S.W. Captain Belcher strongly suspects that extensive banks or ledges of coral connect these islets (northerly) with Tai-pin-san; and a good reason for this offers in the fact of their being included by the natives in the Tai-pin-san group, when they are much closer by half the distance to Pa-chung-san.

Upon nearing the south-west part of Tai-pin-san, and having tacked twice, rather close to two off-lying patches, and obtaining soundings with 15 fathoms, a boat was sent ahead. Upon a given signal, for "danger discovered," the anchor was let go, and the vessel found to be in a secure berth in 12 fathoms, the boat being on the reefs. It is merely an indentation formed by the reefs connecting the western island with Tai-pin-san, and is very unsafe, a heavy sea tumbling in with a southerly wind. The observatory at the south-west angle of Tai-pin-san (at the most convenient landing-place within the reefs and the last rocky point towards the long sandy bay) is in lat. 24° 43′ 35″ N., long. 125° 17′ 49″ E. Tai-pin-san should not be approached at all on its northern side, and reefs are said to extend 7 miles southward of the south point of the island.

Ykimah island, with an islet to the north-east of it, and placed on the charts in lat. 24° 25½′ N., long. 125° 28′ E., 17 miles southward of Tai-pin-san is not otherwise known. It was not seen by Sir E. Belcher who searched for it in 1844, or by the U.S. expedition to Japan under Commodore Perry, 1856.*

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* Captain Von Reiche H.M. (German) S. *Cyclop* reports that the natives say this island, which they name Oumi Aka sima, does exist, and that it is a group of islands, the largest of which is about 300 feet high.

PINNACLE, CRAIG, and AGINCOURT ISLANDS, lying north-eastward of the north end of Formosa, have often been sighted by passing vessels, but as yet no description has been given of them; their positions are as follows:—Pinnacle (about 170 feet in height), lat. 25° 27′ N., long. 121° 58′ E.; Craig, 240 feet, lat. 25° 29′ N., long. 122° 9′ E.; Agincourt, 517 feet high, is in lat. 25° 38′ N., long. 122° 8′ E.

Hoa-pin-su.—The extreme height of Hoa-pin-su is 1,181 feet, the island apparently being cut away vertically at this elevation, on the southern side, in a W.N.W. direction; the remaining portion sloping to the eastward, where the inclination furnished several rills of excellent water. That this supply is not casual is proved by the existence of fresh-water fish found in most of the natural cisterns, which are connected almost with the sea, and abound in weeds which shelter them. The north face of the island is in lat. 25° 47′ 7″ N., long. 123° 30½′ E. There are no traces of inhabitants, indeed the soil is insufficient for the maintenance of half a dozen persons.

The Pinnacle group, which is connected by a reef and bank of soundings with Hoa-pin-su, allowing a channel of about 12 fathoms water between it and the Channel rock, presents the appearance of an up-heaved and subsequently ruptured mass of compact gray columnar basalt, rising suddenly into needle-shaped pinnacles, which are apparently ready for disintegration by the first disturbing cause, either gales of wind or earthquake. On the summits of some of the flat rocks long grass was found, but no shrubs or trees. The rocks were everywhere whitened by the deposit of sea birds, comprising the Booby, Frigate bird, and various Tern, the noise of which is almost deafening. The reef (as shown on the chart) on which these rocks are situated, extends 6 miles eastward, and 4 miles northward of Hoa-pin-su.

Ti-a-usu, about 15 miles to the north-eastward of Hoa-pin-su, appears to be composed of huge boulders of a greenish porphyritic stone. The top of this island from about 60 feet to its summit, which is 600 feet high, is covered with a loose brushwood, but no trees of any size. In addition to the sea birds mentioned on Pinnacle island, the Gigantic Petrel is found here. The centre of the island is in lat. 25° 58½′ N., long. 123° 40′ E.

RALEIGH ROCK, in lat. 25° 55′ N., long. 124° 34′ E., rises abruptly from a reef to a height of 270 feet above the sea, is perpendicular on all sides, and appears in the distance as a junk under sail. The existence of this rock was considered doubtful before July 1837, when it was seen by H.M.S. *Raleigh.* It was afterwards visited by Captain Belcher in

1845, and Commander Bullock in 1866. Owing to its lying in the Kuro Siwo or Japan stream, several very widely differing positions have been assigned to it.*

The LIU-KIU GROUP† (Lu-chu), belonging to Japan, lies north-eastward of the Meiaco Sima group, the distance being about 120 miles from the northern island of the latter group to the southern island of the former. It consists of three large islands—Okinawa sima (Great Liu-kiu), to the south-west; Kakirouma, in the centre; and Amami Oö sima to the north-east. Between them and in their vicinity are numerous smaller islands, some of which form clusters, the whole, with some outlying rocks, lying between the parallels of 26° N. and 28° 46′ N., and the meridians of 126° 42′ E. and 130° 16′ E.

OKINAWA SIMA (Great Lu-chu island), the largest of the group, is about 56 miles long, N.E. and S.W., preserving a tolerably uniform breadth of about 10 or 12 miles. The north end is high and bold, with wood on the tops of the hills; the north-east coast is also abrupt but quite barren, and the north-west side rugged and bare. The south-east side is low, with very little appearance of cultivation. The south, south-west, and western coasts, particularly the two former, are of moderate height, and present a scene of great fertility and high cultivation, and here the mass of the population reside.

There are two good harbours in the island, viz., Napha-Kiang, and port Oonting or Melville, on the west and north-west side. Deep bay, on the same side, and Barrow bay, on the east coast, are not recommended. The inhabitants of the Liu-kiu islands are both friendly and hospitable; the islands are under a Japanese Governor who resides at Napha-Kiang. They have but little commerce, except amongst the neighbouring islands of the group.

Population.—The population of Okinawa sima in 1882, amounted to about one million.

Supplies.—Sugar, rice, fowls, sweet potatoes, cucumbers, and eggs, can be procured.

Shoal.—Apparently shoal water has been reported as lying 12 miles eastward of Okinawa sima in lat. 26° 28′ 50″ N., long. 128° 22′ 21″ E‡.

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* Recruit island, reported in 1861, and this rock are identical.

† *See* Admiralty plan:—Liu-kiu group and adjacent islands, No. 2416; scale, $m = 0 \cdot 17$ of an inch. These islands paid tribute to the Shoguns through the Prince of Satsuma from 1609 to 1868, although there was a nominal king of Liu-kiu. Lately what remained of the local autonomy has been suppressed, and the islands have had extended to them the same administrative system applied throughout Japan.

‡ Capt. von Oesterreicher, Dutch corvette *Erzherzog Friedrich*, 1874.

NAPHA-KIANG,* on the south-west side of Okinawa sima, is the principal seaport of the island, and perhaps the only one possessing the privileges of a port of entry. The outer harbour, or Napha-kiang road, is protected to the eastward and southward by the mainland, whilst in other directions it is surrounded by a chain of coral reefs, which answer as a tolerable breakwater against a swell from the northward or westward, but afford, of course, no shelter from the wind. The inner, or Junk harbour, the entrance to which is between two forts about one cable apart, carries a depth of 2 to 3 fathoms, and though small is sufficiently large to accommodate with ease the fifteen or twenty moderate-sized junks which are usually found moored in it. These are mostly Japanese, with a few Chinese and some small coasting craft, which seem to carry on a sluggish trade with the neighbouring islands. The town of Napha stands on the southern shore of an island and faces the inner or Junk harbour. The island has on its north side (facing the road) two prominent points to which the names Capstan head and False Capstan head have been given, and its low north-east end is joined to the mainland by a bridge.

Sakihana saki or Abbey point, the south extremity of the road, may be known by its ragged outline, and by a small wooded eminence called Wood hill, about 1½ miles south of it

CHANNELS leading to NAPHA-KIANG.—There are three passages leading into Napha-Kiang road, viz., the South, the Oar, and the North channels. When sailing into this anchorage great care should be used to avoid the numerous reefs and rocky patches which surround it.

SOUTH CHANNEL.—Blossom (Asashe) reef, situated about 7 cables N.W. by W. from Abbey point, is composed of coral, about 3½ cables long E.N.E. and W.S.W., with a good passage on each side. The south channel, between it and Abbey point, should be adopted with southerly winds and flood tides, and the Oar channel, between Blossom and Oar reefs, with the reverse.

Sotakana no she, another patch with 1½ fathoms on it lies W.S.W. 1¾ miles from the same point.

Lexington reef lies W. ½ S., 1¼ miles from Abbey point with 2½ fathoms on it.

Abbey reef.—A reef extends from Abbey point to the south-west, and also to the northward; that to the southward about 2 to 3 cables in extent and detached from the shore being known as Abbey reef.

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* *See* Admiralty plan :—Napha-kiang roads, with views, No. 990 ; scale, $m=3$ inches.

Shen no she (Oar reef), about 4 cables in extent lies 6½ cables N.E. ¾ E. from Asashe.

North of Shen no she and only separated from it by a narrow channel reefs extend in a northerly direction for one mile.

OAR CHANNEL, between Asashe and Shen no she has depths of 16 to 24 fathoms in it.

S.W. rock, having 2 fathoms on it, and lying 6½ cables N. by E. ¾ E. easterly from Abbey point, and one mile W. by N. ¼ N. from False Capstan head, must also be avoided. These two reefs lie one on each side of the fairway through the South channel.

Ingersoll patches.—Care must be taken to clear these patches, on which there is only one fathom water; they lie 8½ cables W. ¼ N. from Capstan head, and 7¼ cables N. by W. ¾ W. from South fort.

NORTH CHANNEL, situated between Jisha Kashe and Inabushe reefs is about one-quarter of a mile wide, with depths of 11 to 12 fathoms.

When off Abbey point, Kumi head, a rocky headland, will be seen about 1½ miles north of the town; and upon the ridge of high land beyond it are three hummocks to the left of a cluster of trees. In the distance, a little to the left of these, is mount Onnodake.

Ukiga saki, a remarkable rock, which from its form has been named Capstan head, will next appear; and then to the northward of the town rocky head, with a house upon its summit (Namiageba) called False Capstan head.

Shurijo.—At the back of Capstan head, about 3 miles inland, is Sheudi hill, upon which the upper town, Shurijo, the capital of Okinawa, is built.

Water.—An abundance of water can always be obtained at the fountains in Junk river, where there is excellent landing for boats. There is a good spring near the tombs at Kumi bluff; but unless the water is quite smooth the landing is impracticable, and under any circumstances it is inconvenient from the want of sufficient depth, except at high tide.

Anchorage.—The outer anchorage is in 14 fathoms, muddy bottom, with Abbey bluff bearing S.W. ¼ S., and Capstan head E. by S. ¼ S.; this anchorage would be dangerous with strong westerly gales.

The best anchorage is in Tomari ura (Barnpool,) at the north-east part of the road, in 7 fathoms, where a vessel may ride with great security.

The entrance to Barnpool is between Barn head (reef) and the reef off Capstan head. In entering, do not approach Barn head nearer than to bring the north edge of Hole rock in line with the before-mentioned flat clump of trees on the hill south of Sheudi, until the point of the burying ground (Cemetery point) is seen just clear of False Capstan head.

Tides.—It is high water, full and change, in Napha-kiang road, at 6h. 32m., springs rise 7 feet. The flood tide sets to the northward over Blossom reef, and the ebb to the southward.

Directions.—Through SOUTH CHANNEL (Miyako Guchi).—The clearest approach to Napha-kiang road from the westward is by passing northward of the Kerama islands and sighting Agunyeh island, which will be recognised by its wedge-shaped appearance; from thence steer a S.E. course for the road, passing on either side of the Reef islands; being careful, however, not to approach them too near on the western and southern sides, as the reefs below water in these directions are said to be more extensive than is shown on the chart.

After clearing the Reef islands, steer for Wood hill on a S.S.E. bearing until the notch in distant hill bears E. by N. ⅓ N. (*see* view on plan). This will lead clear of Blossom reef, when the white tomb and clump of trees or bushes southward of Kumi head will be easily distinguished. An E. by N. ½ N. course now until Abbey point is in line with outer trees will clear S.W. rock, when haul up for Kumi head, and select a berth about half a mile northward and westward of False Capstan head. This channel, being quite straight, is more desirable for a stranger entering the harbour than the Oar channel, which, though wider, has the disadvantage of its being necessary for a vessel to alter course some four or five points, just when she is in the midst of reefs which are nearly all covered.

Should the wind veer to the eastward in the South channel, a sailing vessel should not stand to the northward, unless the outer cluster of trees near the extremity of Wood hill is in line with, or open westward of Table hill, a square rocky island to the southward of it over Abbey point. This mark clears also the tongue of Oar reef.

Through OAR CHANNEL (Karafune Guchi).—If the wind be to the north-eastward it will be advisable for a sailing vessel to beat through the Oar channel, in preference to the South channel. To do this, bring False Capstan head in line with a flat cluster of trees on the ridge to the right of the first gap south of Sheudi. This will clear the north tongue of Blossom reef; but unless Table hill be open eastward of Wood hill, do not stand to the southward, but tack directly the water shoals to less than 12 fathoms, and endeavour to enter with the marks on. Having passed north-east of Blossom reef, which will be known by Wood hill being seen to the right of Table hill, stand towards Abbey point as close as convenient, and on nearing Oar reef take care of a tongue which extends to the eastward of it and of the S.W. rock, and be careful to tack immediately the outer trees of Wood point open with Abbey point. In entering at either of the western channels, remember that the flood sets northward, over Blossom reef, and the ebb southward.

Leading mark.—A good mark to run through this channel is to bring the centre of the island in Junk harbour (known by the deep verdure of its vegetation) to fill the gap between the forts at the entrance of that harbour, and steer a. S.E. ½ E. course, until Capstan head bears East, when haul up E. by N. ½ N., and anchor as before directed.

Through NORTH CHANNEL (Yamato Guchi).—This channel between Jisha Kashe and Inabushe reefs is much contracted by a ridge of detached rocks (Victorieuse rocks) lying off the reef on the west side, and should not under ordinary circumstances be attempted by a stranger, as at high water the reefs are almost entirely covered, and it is difficult to judge of the vessel's exact position unless familiar with the various localities and landmarks. To enter by this channel, bring a remarkable notch in the southern range of hills in line with a small hillock just eastward of False Capstan head, and stand in with this mark bearing S. by E. ½ E. until Kumi head bears E. ½ N., when open it a little to the southward, so as to give the reef to the eastward a berth, and select an anchorage.

Directions.—HONG-KONG to LIU-KIU.*—Vessels bound from Hong-Kong to the Liu-kiu islands during the S.W. monsoon, should pass through the Formosa channel, giving Pinnacle, Craig, and Agincourt islands, off the north end of Formosa, a safe berth. From thence a course should be shaped to pass northward of Hoa-pin-su, Ti-a-usu, and the Raleigh rock (*see* p. 219), after which haul to the eastward to sight Komisang, and pass either northward or southward of it, and of Tunashee, and the small islet near the latter, but not between them, as reefs are said to have been seen there. If to the northward, give a good berth to Tu sima, a small rocky islet a quarter of a mile in extent, with a reef projecting 1½ miles to the northward and about 4 cables in other directions; it is about 60 feet high, much broken, and lies N. by E. ⅓ E., 13¼ miles from the northernmost peak of Kume sima, and W. ½ N. from the centre of Agunyeh. Pass southward of Agunyeh. The Kerama group will be seen to the S.S.E., Okinawa sima, visible on the eastern horizon, and in a short time the Reef islets will come in sight to the southward and eastward; these latter are low and sandy, slightly covered with vegetation, and surrounded by coral reefs.

During the N.E. monsoon, round the south end of Formosa; and with the strong current setting to the northward, work to the northward and eastward along its eastern shore. Pass between Hoa-pin-su and the Meiaco Sima group, and either northward or southward of Komisang; if to the southward, a vessel may hug the northern shores of the Kerama islands, as it is believed there are no hidden dangers near them.

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* Lieutenant H. K. Stevens, U.S. Surveying Expedition, 1857.

During the Typhoon season, however, it is advisable to pass southward of the Meiaco Sima group, in order to have plenty of sea room, in the event of encountering one of these storms. The passage southward of the Kerama islands is clear with the exception of the Heber reef and Halls reef.

Vessels bound into the road from the southward may pass close round cape Yakimu, the south extreme of Okinawa sima, and sail along the western coast at the distance of 3 or 3½ miles, leaving Heber and Halls reefs to the westward.

The COAST from Napha-Kiang trends in a N.E. and then N.W. direction, forming a deep bight of which little is known.

Gama Satchi (cape Broughton), off which there is a reef, is the northern extreme of this bight.

From Gama Satchi the coast takes an E.N.E. direction for 58 miles, and then W.N.W. for 26 miles to Suco island, between which and Gama Satchi there is a deep indentation named Deep bay.

DEEP BAY* is formed on the western side of Okinawa sima, and although open to the West and S.W. affords good anchorage off the town of Naguh, about half a mile from its head; for winds from these quarters rarely blow home, and if they do they never raise a sea, as the latter is broken by the great depth of the bay.

The country around the head of this bay is fertile and populous, Motubu and Naguh being the largest towns. At the town of Oon-sah there is a good ship and timber yard where junks are built; here also the natives were found more affable and sociable than on any other part of the coast. This part of Okinawa sima (extending to beyond Nacosi on the opposite coast) appears to be in a high state of cultivation; rice and sweet potatoes being the principal productions; but on the northern side of the peninsula, north of Deep bay, extensive fields of wheat were seen extending uninterruptedly for several miles. Cotton was observed also in many places, but the growth was small and the yield poor. Peas, beans, radishes, turnips, and sugar-cane were growing in considerable quantities, also mustard and ginger. On the Natchijen mountains, 1,488 feet high, cinnamon was growing wild, and there was also a fine growth of timber, which furnishes most of the spars for the native junks; Nakazuni cove, on the north side of the peninsula, being the principal depôt, whence they are transported to the other parts of the island.

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* From the remarks of Lieutenant Whiting. U.S.N., 1854.

SUCO or SETEI ISLAND,* lying about a quarter of a mile from the north-west coast of Okinawa sima, to the northward of Deep bay, has excellent anchorage between its eastern side and the coast, protected from all winds; and wood, water, and fresh provisions can be easily procured.

Anchorage.—There is free egress to the northward and southward, and although the anchorage appears open to the southward, yet it is well sheltered in that direction by the reef extending S.S.E., nearly half a mile from the south end of Suco, and by the southern shore of Deep bay.

TUBOOTCH HARBOUR,* a little to the north of Suco island, is 2 miles long and three-quarters of a mile wide; though open to the westward it is partially protected in that direction by a line of reefs, on which the sea breaks heavily, but the continuity of which is here and there interrupted by a narrow but tolerably deep channel. The north side of this bay is full of banks, but towards the centre there are safe spots with from 3¾ to 11 fathoms water; mud bottom. The best channel is that to the south, which is about 2 cables wide, with a depth of 7 fathoms.

Cape Niofa, the north-western point of Okinawa sima, is 2½ miles to the north of Tubootch, between which and the latter are the small islands named Mina (to the southward) and Gibson (to the northward), with a deep channel between them and the shores of Okinawa.

IYE ISLAND lies to the westward of cape Niofa, between which and the island is a channel 2 miles in width, it is however encumbered with shoals. Iye is 4½ miles in length east and west, and about 1¾ miles broad, and has a sugar-loaf peak 575 feet above the sea.

The COAST from cape Niofa takes an easterly direction for 8½ miles to Kui island at the north side of the entrance to port Oonting.

PORT OONTING,† or Melville, is on the north-west part of Okinawa sima, and its entrance is between the western side of Kui (Herbert) island and the eastern side of the reef fronting the peninsula, and which projects three-quarters of a mile from the shore towards Kui island. Iye sima, lying about 12 miles westward of the entrance, is a good guide for it.

Anchorage is obtained in a narrow strait, nowhere much more than 2 cables wide, separating Yaga-ji (Lyra) island from the mainland of Okinawa sima. Extensive reefs nearly connect Kui island with Yaga-ji, from which it is distant a little more than a mile; the channel lying between these islands and reefs to the eastward, and the before-mentioned reef and shore of Okinawa on the west.

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* *See* Admiralty plan:—Tubootch and Suco Harbours, on sheet, No. 2,416; scale, *m* = 1·75 inches.

† *See* Admiralty plan:—Port Oonting, with views, No. 2,436; scale, *m* = 3·4 inches.

The village of Oonting is on the shore of the main island just within cape Basil Hall at the entrance to the narrow strait.

Water.—Good water can be obtained at the village of Oonting.

Tides.—It is high water, full and change, in port Oonting at 6h. 35m.; springs rise about 8 feet.

Directions.—When bound to this port from the westward, passing to the northward of Iye sima, an E.S.E. course will lead to the entrance; here it will be advisable to heave-to, or anchor in 20 or 25 fathoms, until boats or buoys can be placed along the edges of the reefs bordering the channel; for without some such guides it will be difficult for a vessel of large draught to find her way in between the reefs, which contract, in places to within a cable's length of each other, and are at all times covered.

In entering, steer for the western shore of Kui island until Hele rock is in line with Double-topped mountain (a distant double-topped hill, the second highest of the range,) bearing S.E. ½ S. Steer in on this mark until Chimney rock bears S. ¼ E.; then for Chimney rock until Rankin point bears S.W. ½ W.; then for that point until the port is entered, when anchor, giving the vessel room to swing clear of the reef extending northward of Rankin point, and she will be as snug as if lying in dock, with good holding ground, completely land-locked, and almost entirely sheltered from every wind.

SHAH BAY,* about 8 miles E.S.E. of port Oonting, is a beautiful land-locked sheet of water, but the reef fronting the entrance prevents its being accessible to vessels of larger size than the junks which frequent it; within the entrance the water deepens to 12 and 8 fathoms, the bottom being soft mud. On the southern shore of the bay was found iron ore, mineral coal, and sulphur. The coal appeared of poor quality and mixed with earth, but good coal might perhaps be found by digging.

The COAST from Shah bay trends to the N.N.E. for 47 miles, and appears to be void of anchorage; it has not been minutely examined, but it is probable that it is very foul.

Cape Heto, the northern extremity of the island, is hilly, and from thence round the eastern shore of Okinawa, as far as Barrow bay, there appears to be no anchorage. A small island, named Sidmouth, surrounded by reefs, lies off the north-east side of the island.

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* *See* Admiralty plan:—Shah bay, on chart No. 2,416; scale, $m=1\cdot75$ inches.

BARROW BAY is a deep inlet, bounded by shoals, near the middle of the eastern coast of Okinawa. The following description is by Lieutenant G. B. Balch, of the U.S. ship *Plymouth* :—

"A reef, of coral formation and bold to approach, commences 5 miles from the south point of Okinawa, and extends in an unbroken chain, outside all the small islands, as far as the north-east point of Ichey island, with the exception of a narrow channel between the islet off the north-east end of Kudaka island, and the island of Taking. Ichey island forms the south-eastern point of Barrow bay, which is useless for all purposes of navigation, being exposed to the east winds and ocean swell. There is, however, secure anchorage in about 15 fathoms water on the western sides of Ichey, and of Hanadi, the next islet to the southward; this anchorage is the only place of shelter on the eastern coast of Okinawa."

Mathews bay, near the south-east end of the island, is of no practical utility, being filled with coral reefs, which skirt the shore.

Cape Yakimu, the south end of Okinawa, is hilly, and appears steep-to; it would, however, be advisable not to approach it within 2 or 3 miles, as it has not been closely examined.

Heber reef, reported as a rock about 5 feet above water, surrounded by reefs, lying 6 or 8 miles W.S.W. from cape Yakimu, has been inserted on the charts in lat. 26° 2′ N., long. 127° 34¾′ E. Its existence is doubtful as its description agrees in every particular with Halls breakers.*

Halls breakers is a large, circular, rocky patch, a part of which is above water; it lies 7 miles W. by N. ⅓ N. from the south-west point of Okinawa sima.

The KERAMA GROUP lies to the westward of Napha-kiang, between the parallels of 26° 7′ N. and 26° 16′ N., and the meridians of 127° 15′ and 127° 29′ E. It consists of the Maikirima islands, Koru sima (Saddle island), Toka shika sima, Aka sima, Yakang island, Zamami sima, and Kupa sima, with many islets and rocks in their vicinity.

Maikirima islands, the easternmost of the group consist of one island 540 feet in height, and two other islets to the northward; the northern (Cone islet), in lat. 26° 14′ N., long. 127° 28½′ E., has a conspicuous detached rock off its south-west end, and must not be approached within a mile, as reefs surround it.

Koru sima (Saddle island), the most northern of the Kerama group, in lat. 26° 15′ N., long. 127° 25½′ E., is 459 feet above the sea; off its north-west end there are a few small islets and rocks, and a reef extends half a mile from its south and south-west ends.

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* Searched for without success by Capt. Zirzow, in German war vessel *Vinetä*, May 1881.

Shag rock lies in mid channel between the end of Koru sima and the South rock of the Maikirima islands.

Zamami sima, the north-western island of the group, is 3 miles long E.N.E. and W.S.W., and is very rugged and irregular of outline. In the centre, two deep bights, one on each side, narrow the island to a low neck half a mile wide; the land on either side is comparatively high, the highest part being 540 feet above the sea.

Whale head, is a small islet lying nearly half a mile from the north-east side of Zamami sima. It should not be approached within a distance of 1½ cables.

Yakang island is of circular form, about a mile in diameter, and its peak is 756 feet in height; the island is bordered by a reef which stretches farthest to seaward off its north end, and has a detached rock at its north extreme.

Kupa sima is the westernmost of the group; it is 916 feet above the sea, and has a reef with several detached rocks projecting from its north-west side, as also from the south point.

Aka sima consists of three islands with several islets and rocks the whole lying in a N.N.W. and S.S.E. direction to the south of Zamami, and east of Yakang and Kupa sima. The northern island, which is the largest, is 641 feet in height.

Tokashiki, the centre island of the group, 553 feet in height, is the largest, being nearly 5 miles in length (north and south), and more than one mile in width. An islet with a reef, having detached rocks on it, extends 1½ miles from its north-east point, and a large rock (Chimney rock) 315 feet high, with a similar reef projects from the southern point.

Mole and Whale reefs are rocky patches appearing above water; the former lies south-west 1½ miles, and the latter S. ½ W. 2¼ miles from the south point of the most southern of the Aka islands.

Kerama channel.*—**Anchorage** may be had to the south of Zamami sima opposite the bight before mentioned in that island. In approaching this anchorage (Aoga ura) from the northward, take care to avoid the patch lying off the eastern point of that island, and in nearly mid-channel at the northern entrance to the Kerama channel. Several other patches exist, of which there is no description. Great caution should therefore be used when navigating in this locality.

Tides.—It is high water, full and change, in Aoga ura, at 6h. 43m.; springs rise 5¼ feet, neaps rise 4 feet.

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* *See* Admiralty plan:—Kerama channel and anchorages, on chart No. 2416; scale, *m* = 1·25 inches.

REEF ISLANDS are four in number, lying 4 miles W.N.W. from the entrance to the channels leading to Nafa-kiang; the two easternmost are together on the same reef, and are low, sandy, slightly covered with vegetation, and surrounded by coral reefs.

TUNASHEE lies N.N.W. ¼ W. 9½ miles from Yakang; its northern peak is 492 feet in height, and that to the southward 603 feet above the sea. A reef extends to a considerable distance from its north and north-west sides.

Aghesinak (Flat island), lying about 2½ miles to the westward of the north peak of Tunashee, is merely a rock surrounded by a reef.

KOMISANG, an island lying about 20 miles west of Tunashee, is very irregular in shape, about 6 miles long, and the same in width; its northern peak is 1,108 feet in height, and that to the southward 1,028 feet; the western side of the island being fringed with reefs.

Elizabeth reef.—A very dangerous reef, extends 6 miles to the eastward of Komisang.

High rock.—Off the south end of Komisang is a high rock about one mile from the extreme point of the island.

TU SIMA, in lat. 26° 35½′ N., long. 126° 51′ E., lies N. by E. ½ E., 13¼ miles from the north peak of Komisang. It is a rocky islet about 60 feet high, one quarter of a mile in extent, with a reef surrounding it.

AGUNYEH, a wedge-shaped island about 3 miles long (N.E. and S.W.) and 300 feet high, lies N.N.E. 13 miles from Tunashee.

The MONTGOMERY GROUP consists of two large islands, with several islets and shoals near them. It lies north-west from cape Heto (the north point of Okinawa sima), forming a channel 15 to 16 miles in width.

Yebeya sima, the largest and northern island of the group, 963 feet in height, is 7 miles long (N.E. by N. and S.W. by W.); off its southern end a reef extends 2½ miles to the south-west, having an islet (Jabo islet) about a mile from the shore, and a rock awash at its extreme.

Isena sima, the southern island, is about 400 feet above the sea. Its south-east extreme, a conspicuous and prominent point, attains an elevation of 309 feet; there is a small detached rock about one mile east of the island.

Kusikawa, an islet surrounded by detached rocks, lies between Yebeya and Isena, S.E. by E. 1¼ miles from Jabo islet.

Yanagi islet, to the southward of Isena sima, is about 50 feet high, and has off its north-west side a reef with several ocks on it.

YORI SIMA, lying N.E. ½ N. 12 miles from the northern point of Okinawa sima, is 413 feet high, wooded, and nearly surrounded by a reef which projects farthest off its north and east sides. The channel between it and Okinawa sima, as well as that between it and the Montgomery group, is apparently safe.

YERABU SIMA, situated 18 miles northward of Yori sima, is 9½ miles long N.E. and S.W., and well wooded. Its southern peak, 687 feet in height, is in about lat. 27° 22½′ N., long. 128° 35′ E. The channel between it and Yori sima is safe.

KAKIROUMA, Tok sima of Siebold, or Crown island of Broughton, is about 15 miles long N. and S., and 9 miles broad; the highest peak (2,207 feet), which is near the centre on the east side, is in lat. 27° 45′ N., long. 128° 57½′ E. Its northern peak, 1,860 feet above the sea, has a village built on its north-west face.

The south-east and south coasts of this island are protected by a fringing reef extending one to 3 cables off shore, containing several boat harbours and one junk harbour; the latter is situated 2 miles southward of cape Ototsino, near which is a village of some 1,500 huts, principally of a beehive pattern. The entrances through these reefs are marked by poles. Soundings of 30 to 40 fathoms, gravel, will be obtained at a distance of 4 cables from the reefs.

The island is wooded and well cultivated. The north point is marked by two hills and a steep fall to the point from the outer one. The peaks are continuous to near the south point (Ohotabu) where the land is low. North of Black point, on the western side of the island, is a high black cliff (400 feet); the cliffs then decrease to Ohotabu, where they disappear.

Tok sima rocks, two in number, 166 feet high, lie 2 miles north of Kakirouma island.

IWO SIMA, or Sulphur island, lies 34 miles west of Kakirouma. The channel between them is safe. The south peak, in lat. 27° 52½′ N., long. 128° 14′ E., is 541 feet high, and is a volcanic mountain still in action, the cliffs near the volcano being of a pale yellow interspersed with brown streaks; the ground is very rugged and broken, with here and there a thin coat of brown grass. The south end is of a deep red colour, with occasional spots of bright green. The island is 1½ miles long N.W. and S.E., and is inaccessible.

AMAMI OÖ SIMA (Harbour island)[*] is the largest of the chain of islands lying between Okinawa sima or Great Liu-Kiu and Japan.

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[*] *See* Admiralty chart:—Lui Kiu islands, Oö sima group, No. 873; scale, *m* = 0·17 of an inch.

It is about 30 miles in length N.E. and S.W., well cultivated with sugar, wheat, potatoes, bananas, and sago palm, and, from the number of villages seen along the coast, must contain a large population. There are two peaks on its south end, 1,674 and 1,420 feet respectively above the sea.

Some of the cliffs are black, giving an appearance of coal. The strata are in places much distorted, and the higher spurs denuded to sharp ridges. Paths are cut in every direction as in Japan.

The dialect and attire of the natives are Japanese. The houses are partly beehive pattern, and partly Japanese. Trade is carried on by schooners from Japan.

This island was partially surveyed by the American squadron in 1856, and by the Japanese in 1873, the outline of its coasts appears much broken and deeply indented with numerous bights, most of which are very bold. The north end is high, and being connected with the main part of the island by a narrow low isthmus, it has the appearance on some bearings of being isolated.

Wood and water are good and plentiful, but refreshments scarce. The inhabitants are timid and harmless.

Foul ground appears to extend about 2½ miles N.E. by E. from the north end of Amami Oö sima, and two rocks to rise from it, the northern of which, Isroken (North rock), is 76 feet high.

There are several open bays on the north and west sides of the island, where there is anchorage, those best known being Fukau bay, Naze harbour, and Hancock bay. Sima-u bay, on the east coast, also affords anchorage.

Hancock bay,[*] an inlet in lat. 28° 17′ N., long. 129° 10′ E. (approximate), is about 6 miles long, and varies from one-half to one mile in width. Off the northern shore at the entrance is Itateka sima, an island about 1,000 feet high. The main entrance to Hancock bay is southward of this island; its eastern shore being connected to the main by a reef. Being land-locked at the upper end the inlet affords good shelter in the small bays. The depth of water over the greater part of Hancock bay varies between 27 and 40 fathoms, mud bottom.

Approaching from the northward, a reef appears to extend right across the entrance; it is awash at half tide, and extends one-quarter of a mile westward from the west point of Itateka island. Hills surround the bay from 500 to 1,800 feet high, their sides reaching precipitously to the water's edge, and are of volcanic origin. There are several villages on the shores of the inlet, but the inhabitants are poor, timid, and very dirty. Wood and water are easily obtained.

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[*] *See* Admiralty sketch:—Hancock bay, No. 771; scale, *m* = 3·5 inches. The natives do not appear to have any use for money. Trading is done by barter.—C. W. Stuart, Navigating Sub.-Lieutenant, H.M.S. *Curlew*, 1873.

Sots-taka-saki, the south-west point of Hancock bay, may be distinguished on approaching by a large land slip on its northern side, which gives it the appearance of a red cliff; the rocky islet off it is small, and not seen till close in.

Outer point, situated 2½ miles north-east of Sots-taka saki, when seen from the westward, is a remarkable conical shaped peak, and has the appearance of an island.

Fortune point.—At one cable N.W. of Fortune point, a depth of 6½ fathoms, rock, was found, with deep water close to, it is therefore to be avoided, as rocks may exist in the vicinity.

The Fairway up the bay to the anchorage off Asken saki, is free from danger, but the outlying points should be avoided, as they all appear to have ledges extending from them, from a half to one cable distance.

Anchorages.—Large vessels may anchor in safety on a line between Tree point and Observation point, in 18 fathoms, mud, care being taken to avoid the reef which extends three-quarters of a cable southward of Tree point. Small vessels may anchor in Curlew bay, and between Pillar and Lava points.

Supplies are not plentiful in Hancock bay, though fowls, eggs, goats, and pigs may be obtained in small quantities. Sago, rice, and sugar cane are the principal products.

Tides.—It is high water, full and change, in Hancock bay, at 7h. 30m.; springs rise 7½ feet.*

Naze harbour, about 21 miles north of Hancock bay, and about 20 miles south-east from Ogle island, affords anchorage close to the head of the southern of the two bights which comprise the bay; the other bight is full of rocks. Off the southern point of entrance to Naze bay is an island connected to the shore by a reef; it is steep-to on its north side. The water is deep over the whole of the bay except at the anchorage indicated.

OÖ SIMA or PORPOISE STRAIT.† — **Kageroma sima,** a narrow island of irregular shape, its coasts being much indented, lies parallel to the south-west shore of Oö sima, forming a strait known as Oö sima or Porpoise strait, 10 to 12 miles in length and from three-quarters to 2 miles wide

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* Staff Commander J. B. Walker, H.M.S. *Iron Duke*, 1882.

† *See* Admiralty plan :—Oö sima strait, on chart No. 873; scale, $m = 0\cdot5$ of an inch.

Directions.—Entering from eastward, choose a mid-channel course through the strait, observing that the north shore has the least number of sunken rocks off it. A bank of 6 to 7 fathoms, coral and hard ground, lies 1½ miles from this entrance, but westward, the strait has a mid-channel depth of 25 to 50 fathoms. This bank is not safe to anchor upon, as not only is the bottom hard, but it is subject to tide whirls. In the bay on the north shore 3 miles from the east entrance, the bottom is sand, but the 10 fathoms line of soundings is within 2 cables of the shore, so that in the event of a strong gust down the hills a vessel is liable to drag her anchor.

A depth of 160 fathoms, coral sand, will be found 5 miles off the eastern entrance to Oö-Sima (Porpoise) strait, and 100 fathoms, gravel, one and a half miles off the western entrance.

Kuji Mura bay, on the north shore of the strait, has anchorage for two vessels at single anchor in 10 and 12 fathoms. The bottom is fair holding ground, being a mixture of mud, broken coral, and gravel.

Probably no anchorage in this strait would be secure for a vessel during a typhoon.

Tides. — It is high water, full and change, in Oö sima strait, at 6h. 34m.; springs rise 6½ feet, neaps 4½ feet.

Ioro sima and Uke sima are two small islands from 1½ to 2 miles southward of Katona sima; the former is 1,002 feet high, and the latter 1,353 feet. In the vicinity of Oö sima are many scattered islets and rocks, most of which are high and conspicuous.

Waré rock at the north-western entrance to Oö sima strait is 116 feet high; and half a mile S.S.W. from it is a rock awash.

KIKAI-GA SIMA, lying about 15 miles south-east of the north end of Oö sima, is about 7 miles in length, N.N.E. and S.S.W., moderately high (864 feet), and is inhabited. The summit is in lat. 28° 18′ N., long. 129° 57½′ E.*

Germantown Reef.†—The U.S. ship *Germantown* in 1859 struck on a coral reef said to lie in lat. 28° 14′ N., long. 129° 54′ E.‡ From the shoalest spot found, 6 feet, the highest terrace on Kikai-ga sima bore N.E. ¼ E. distant 6 or 7 miles. The reef is about a mile long in a N.N.E. and S.S.W. direction, and half a mile wide.

Another shoal spot was found lying 2 miles North from the centre of this reef, with apparently a clear passage between. Reefs were also seen from aloft, extending from one to 2 miles from the south-west and south-east points of Kikai-ga sima.

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* From American chart, 1855.

† Hong Kong Register, 26th April 1859.

‡ Probably Marsh reef is one of the two shoals found by the *Germantown*.

Marsh reef, placed on the charts in lat. 28° 12′ N., long. 129° 54′ E., was reported by Mr. Marsh in 1853, as lying 7 miles S.W. of Kikai-ga sima, extending N.N.E. and S.S.W. about 3 miles, with a depth of 12 feet on it at high water.

Anchorage.—The *Germantown* anchored at 1¼ miles from the shore in 25 fathoms, coral and shell, with the south-east point of Kikai-ga sima bearing S.E. by E. ½ E., and the south-west point N. ½ E. The tides here set strong; the ebb from E.N.E. to N.E., and the flood from West to W.N.W. The strength was about 2 knots per hour, with an undertow of at least double that velocity.

Hesper island, placed on the charts in lat. 28° 4½′ N., long. 130° 12′ E., was reported by Mr. James, commanding H.M.S. *Hesper*, 1864, as lying S.E. by S., 18 or 20 miles from Tabiyo saki, but it is doubtful if this latter island exists, at least in the position assigned to it; the position of Hesper island is therefore very uncertain.

SANDON or MACEDONIAN ROCKS, a group the highest of which is about 30 feet above the sea, with two low detached rocks to the westward, and a reef between them, lie in lat. 28° 44′ N., long. 129° 47½′ E. At a quarter of a cable from their north-west side were 12 fathoms water, and at half a mile to the north-west 15 to 22 fathoms with overfalls over an uneven coral bottom.

The LINSCHOTEN ISLANDS, or Cecille archipelago (so called in the French charts after Admiral Cecille, by whose directions the islands were examined), extend from lat. 28° 49′ N. to 30° 6′ N., and from long. 129° to 130° 3′ E. They consist of 12 islands and rocks, some of which are inhabited, and there appears to be many safe channels between them. The mariner is, however, cautioned not to place too much dependence either on their configurations or positions as shown on the chart of this part of the ocean, for they are by no means correct; the information concerning them has been obtained from the Japanese as collated by Siebold, and from detached surveys and corrections by English, French, and American navigators. The French corvette *La Sabine* examined them in the year 1846; their positions, to which we have given the native names, and restored those of former explorers, appear on the chart of her track to be as follows:—

YOKO SIMA (Ogle island), rising to the height of 1,700 feet above the sea, is an extinct volcano, the highest part of which is in lat. 28° 48′ N., long. 129° 2′ E.

Kaminone (Royalist island), lies 1½ miles to the northward of Yoko sima, is 972 feet above the sea, and volcanic. Two islets lie off its west side.

TOKARA SIMA (Pennell island), 860 feet above the sea, is in lat. 29° 8′ N., long. 129° 13½′ E. It is inhabited, and the north end is cultivated. Several rocks and islets lie off its S.W., East, and S.E. sides.

SIMAGO (Cooper islands), are four small islets, the highest of which, 372 feet above the sea, is in lat. 29° 13′ N., long. 129° 20½′ E. The easternmost islet bears from it about E. ½ N., distant 3 miles.

AKUISI SIMA (Samarang), 1,978 feet above the sea, is 4 miles long (E. and W.), in lat. 29° 27′ N., long. 129° 37½′ E.* The shores are generally steep and inaccessible, except at one place, where there appears to be some cultivated land; the west end is bold and high and thickly wooded. A small islet lies off its north-west face.

SUWA SIMA (Archimedes) is an active volcano, 2,706 feet high, in lat. 29° 38′ N., long. 129° 42′ E., and is about 5 miles long and 3 miles wide.

FIRA SIMA (Disaster), 812 feet high, in lat. 29° 41′ N., long. 129° 32½′ E., lies 8 miles W.N.W. of Suwa sima.

NAKA SIMA (Pinnacle), in lat. 29° 52′ N., long. 129° 52½′ E., is 3,400 feet above the sea and is an active volcano. The island is 5 miles long (N.W. and S.E.) and 3 miles wide. Off its south and south-east sides are two islets respectively 87 and 86 feet high. A reef is said to lie in the channel between this island and Kutsino sima.

HEBI SIMA (Dundas) rises to the height of 1,687 feet above the sea, in lat. 29° 54′ N., long. 129° 33′ E. There is a small islet off its north-west face.

KOHEBI SIMA (Forcade), 3½ miles to the south-eastward of Hebi sima, is 996 feet above the sea, in lat. 29° 53′ N., long. 129° 38′ E.

KUTSINO SIMA (Yerabout) is 4 miles long N.N.W. and S.S.E.; and its peak, which is 2,230 feet above the sea, is in lat. 29° 59′ N., long. 129° 56′ E.

Henty reef, apparently about 2 cables in extent, on which the sea was seen breaking heavily, has been reported as lying N.W. ½ N. 3¾ miles from the north point of Kutsino sima, and about 10½ miles to the westward of Firase.

FIRASE (Blake reef), consists of several islets and rocks, extending about 3 miles in a N.E. and S.W. direction; the highest islet, 92 feet above the sea, is in lat. 30° 4′ N., long. 130° 3′ E.

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* Captain P. Shirley, U.S.S. *Lackawana*, reports the longitude of this island as being 129° 27′ E.

COLNETT STRAIT, which separates the Linschoten group from the group to the northward, appears preferable to Van Diemen strait for vessels bound from China to Japan ; Yakuno sima, being lofty and steep-to, is an excellent mark ; besides which better weather is generally experienced in this strait than in the latter.

Medusa reef,* reported as being indicated by discoloured water and high breakers, 2 miles in extent north and south, and lying 8 miles to the northward of Firase, is inserted on the chart in lat. 30° 13′ N., long. 130° 4′ E. ; it has not since been noticed, but if it exists it is a dangerous impediment to the navigation of Colnett strait.

YAKUNO SIMA.—To the north-eastward of Firase, is the island of Yakuno, the highest peak of which, mount Motomi, 6,345 feet high, is in lat. 30° 20′ N., long. 130° 31′ E., and shows double from the eastward. The island is about 15 miles long north and south, and 15 miles wide, and has several lofty peaks. The village of Muja ura lies on its north-east side at the head of a small bay. Off the south-west side of the island is an islet (Ko sima), and off the east side is White rock.

NAGAROBE, (Yerabu sima,) Julie island of the French, lies 7 miles to the north-westward of Yakuno sima. The island is 6 miles long, E.S.E. and W.N.W., and its greatest breadth is 3 miles ; it is an active volcano, and the highest peak near the south-east end is 2,297 feet above the sea, and is in lat. 30° 26½′ N., long. 130° 14′ E.

TANEGA SIMA, the most eastern of the Linschoten group, is 32 miles long., N.N.E. and S.S.W., and its north point is 12 miles E.N.E. from Make sima ; it has not been minutely examined. Its northern part is low and rocky, rising to bluffs of 100 to 150 feet in height, with smooth round undulating hills ; the centre and southern end is more elevated, the highest peak being 1,200 feet high, and the island generally well wooded. A small bay with a sandy beach is formed on the north-west of the island, where anchorage may be obtained for a vessel of moderate size, in 8 or 9 fathoms, sandy bottom. A heavy tide race extends some distance from the north end of the island, and on the French chart several towns or villages are noticed.

Off the south-east point of the island is a conspicuous detached rock, 80 feet in height, named S.E. rock.

A reef † of rocks showing above water, and a shoal about 2 miles S.S.E. from them, are reported as lying nearly 7 miles from the south-east point of Tanega sima. "When the south point of Tanega sima bore North about 8 miles, and the south point of Yakuno sima W. by N., struck soundings in 8 fathoms, rocky bottom; the following cast no bottom in 13 fathoms."

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* Reported by the Commander of the Dutch war steamer *Medusa*, and described in the Official Netherlands Magazine, 1864.

† This shoal was reported by Mr. A. F. Boxer, Commanding H.M.S. *Hesper*, 1865. The bearings, however, do not at all agree with the estimated distance.

To clear these dangers, the south point of Yakuno sima should not be brought westward of W. by N. until the high conspicuous rock off the south-east point of Tanega bears N. ½ W.

This reef has been inserted on the charts 5 miles South of S.E. rock, in lat. 30° 15′ N., long. 131° 2½′ E., but its position is very uncertain.

Breakers.*—Heavy breakers have been reported as having been seen in lat. 30° 14′ N., long. 130° 53½′ E. (approx.) on the south side of Vincennes strait.

VINCENNES STRAIT between Yakuno sima and Tanega sima is 10 miles wide in the narrowest part; caution is necessary in approaching the positions of the above-reported shoals.

MAGE NO SIMA (Make sima), 22 miles E. by S. ¼ S. from Take sima; 18 miles S.S.E. ¾ E. from Sata no misaki; and only 5 miles from the western shore of Tanega sima, is a shelving island, with a summit 256 feet high, tapering away to rocky reefs at its northern extreme. The whole of the shores are rocky, and there are but few trees on the island, but it is well covered with grass, and is used as a rearing establishment for cattle, of which there were 200 on the island in 1880, as well as 200 deer. There are a few streams traversing the island. At about the middle of the east side of the island is a clump of trees, near which are a few huts. A reef of rocks lies off the village, forming a creek which facilitates landing. The island is resorted to by fishermen during the summer months.

Mage no sima should be approached with caution, and any vessel intending to anchor off the east end of the island (the only convenient anchorage), should keep well clear of the land until the summit bears S.W. by W., and not bring it southward of that bearing, so as to give a good berth to the reefs which extend from 2½ to 3 cables from its north-east extreme.

Anchorage, in 7 fathoms, well sheltered from westerly winds, may be obtained with Sata no misaki seen just clear of the north extreme of the island; the south extreme (grassy) bearing S. ¾ W., the summit S.W. ¾ W., and the village about W. by S. ¼ S. The north end of the island has an islet and some rocks off it, and should not be closely approached.

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* Reported by Mr. Mills, of the ship *Malvern*, 1872; from its assigned position the south point of Tanega sima bore N. ½ E., and the south point of Yakuno sima West.

TAKE SIMA (Apollo island), in lat. 30° 48½′ N., long. 130° 26½′ E., lies 4 miles from the east end of Iwo ga sima, is 2¾ miles long E.N.E. and W.S.W., and about one mile wide; its summit, 742 feet high, being on the north-east side. The west point of the island rises to a conical hill 244 feet high, and the whole island is covered with bamboo, which, with the exception of some small patches, is almost impenetrable.

. Sunken rocks lie off most of the points; none, however, are more than 1½ cables off shore. A rocky spit extends 2½ cables from its east extremity.

A small village is situated near the centre of the island, the inhabitants hauling their boats up in a small indentation on the north side of the island, where, during the summer months, there is convenient landing. With northerly winds, there is another landing place on the south side of the island.

Anchorage.—Indifferent anchorage may be obtained, sheltered from southerly winds, in the small bight on the north shore, in 13 to 14 fathoms, the bottom being sand, shells, coral, and rock. The anchor should be let go just before shutting in Take sima no oge (Pinnacle rock) off Iwo ga sima, behind the north-west point of Take sima.

H.M.S. *Sylvia* anchored in 12 fathoms under the south-east end of the island, but this anchorage is not recommended.

IWO GA SIMA (Volcano island), 22 miles S.W. by W. ½ W. from Sata no misaki lighthouse, is 3 miles long east and west, 1¾ miles across, and its summit, an active volcano, 2,331 feet above the sea. Excepting the slopes of the volcano, and some small portion on the western side, which is under cultivation, the island appears to be covered with bamboos. The whole of the eastern portion of Iwo ga sima forms the slope of the volcano, from the higher parts of which jets of vapour and smoke issue in all directions. The west coast rises precipitously from the sea, and thence extends as a moderately level plateau for a short distance to the base of the bamboo covered hills. Large quantities of sulphur are collected and sent to Kagoshima.

Asashi.—Some rocks and reefs extend about three-quarters of a mile from the East and N.E. points of the island, and two rocks, from 50 to 60 feet high, lie about half a mile from the S.E. point. When bearing E. by S. the northern and higher appears like a martello tower; and the southern resembles a haycock, the extent of the whole being about 3 cables. It is not known if these rocks are detached or not.

On the south side of the island is a snug little creek, at the head of which, situated on a black sandy beach, is a small village; the water in it is impregnated with sulphur, and is too deep to anchor in.

Sakuba hana, the western entrance point of this creek, is bold. A rock, awash at half tide, lies a cable from it, half a cable south of which is another sunken rock with less than 6 feet water on it.

Another sunken rock with less than 6 feet water on it, lies nearly 2 cables from the west extreme of the island.

Take sima no oge (Pinnacle rock).—At three-quarters of a mile north-eastward of Iwo ga sima lies a reef about a mile in extent. Situated on this reef is Pinnacle rock, 65 feet high. Fish are caught in great numbers round about the coast.

YAKURO or KOWOSE (Powhattan reef).—This dangerous reef, in lat. 30° 42′ N., long. 130° 19′ E., was discovered by the U.S. frigate *Powhattan* in January 1860. The greater part of the reef (about 3 cables in extent) is above water, and the centre rock, 22 feet above the sea, lies 2½ miles S. ¼ W. from Asashi.

Other rocks were seen awash, or a few feet above water, stretching out about three-quarters of a mile from the centre rock.

Shoal.—At 2½ miles E.N.E. from Yakuro, and 3 miles S.E. by E. from Asashi, is a knoll of sand and coral, on which a depth of 16 fathoms was obtained.

USE (Trio rocks) lying W. ¾ S. 18 miles from Iwoga sima, and S.E. by E. 8½ miles from Kuro sima, are three distinct islets of about an equal height; the centre islet, 178 feet above the sea, is in lat. 30° 45′ N., long. 130° 7′ E. From the westward and eastward they are in line and appear as a solid tower. The western rock is also 178 feet high, the eastern 155 feet, and there is a fourth rock 7 feet in height lying 1½ cables to the eastward of the others; the whole group occupies a space of a little more than 2 cables. There is deep water close to them on all sides, the depths increasing rapidly, except on the south side, where a submarine plateau, on which is a depth of 70 fathoms, appears to extend for some distance.

KURO SIMA, (St. Clair island,) is about 3 miles long East and West, and 2½ miles broad; lying 38 miles W. by S. from the lighthouse on Sata no misaki (cape Chichakoff). The shores of the island are steep and rocky, except at the west point where the land slopes more gradually, and there is no anchorage; but in a small indentation immediately west of the east point of the island, shelter from south-west or southerly winds may be obtained in 12 fathoms, sand and shell bottom, off a village where landing can be affected. There is another small village on the west side of the island. Kuro sima presents a wild and inhospitable aspect, and is thickly covered with scrub, trees, and bamboos, with but few patches of cultivation, sufficient only for the wants of the few fishermen who inhabit it. The summit* of the island (near the centre) rises to a height of 2,028 feet above the sea. There are detached rocks off the east, south-east, south, and south-west points, none of which, however, are more than 1½ cables from the shore.

Shocks of earthquakes are often felt at Kuro sima, and it is frequently visited by hurricanes.

There is also a landing place on the south side of the island, where, in 1871, a waterfall was observed.

Pinnacle rock.—Off the east point is a pinnacle rock 165 feet in height.

KUSAKAKI SIMA, (Ingersoll or Morrison rocks.)—This cluster of remarkable islands, rising steeply on all sides, extends in a north-east and south-west direction a little more than 3 miles, with a width of only a quarter of a mile.

The largest island is 530 feet high, the summit being one mile from the southern point of the group in lat. 30° 50′ N., long. 129° 26′ E. The eastern island is 445 feet high, and on its east side are a few huts used by fishermen, who visit these islands at certain seasons.

There is a channel about half a mile wide between the two easternmost islands of the group; this, however, should only be used in cases of emergency.

The tides appear regular, flood flowing to the northward, and ebb southward. The islands are steep-to, but a vessel when passing this group should not approach nearer than a mile.

VAN DIEMEN STRAIT (Nana shima no seto,†) lies between the southern shores of Kiusiu island on the north, and the islands Kuro sima Iwo ga sima, Take sima, Make sima, and Tanega sima, on the south-west and south; it is clear of dangers,‡ and consequently safe. Making this strait from the southward and westward, Kuro sima, 2,028 feet high, and the active volcano Iwo ga sima, 2,331 feet, form good landmarks on the south, and the lofty cone-shaped mountain O Kaimondake (mount Horner), on the coast of Kiusiu, 3,020 feet high, forms a conspicuous landmark on the north side. The only drawback to the navigation of this channel is the heavy weather and thick atmosphere usually met with off Sata no misaki; the Japan stream setting strong through the strait at all times causes the latter to become a serious disadvantage, which is, however, somewhat lessened by the light now exhibited on the above cape (*see* page 245).

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* At certain seasons of the year the natives burn the grass, the smoke from which might give the impression of its being an active volcano.—Commander P. Aldrich, R.N.

† Adapted to the survey of Commander P. Aldrich, 1879.

‡ A shoal spot of 8 fathoms has been, however, reported to lie about 2½ miles S.S.W. of Sata no misaki, the south point of Kiusiu.

Vessels navigating Van Diemen strait are cautioned against passing southward of Iwo ga sima, as there are detached rocky shoals and very uneven bottom in that direction. The reef of rocks (the highest of which is a pinnacle 65 feet in height) situated 9 cables N.E. from the Iwoga sima should also be given a wide berth, as the currents run strong, and are irregular in its vicinity. The north extremes of Make sima and Tanega sima are both low and shelving and should not be approached too closely.

Take sima is clear all round, and the coast of Kiusiu may be approached to within a mile.

Current.—The current (Kuro siwo) sets through Van Diemen strait in an E.N.E. direction, with varying force (*see* page 37), its greatest strength being found close off Sata no misaki, and the north point of Tanega sima. Vessels bound to the westward through the strait will generally find it advantageous to hug the coast of Kiusiu.

CHAPTER V.

THE JAPAN ISLANDS:—COMPRISING THE SOUTH AND EAST COASTS OF KIUSIU, SIKOK, AND NIPON, AND THE ISLANDS LYING SOUTH OF YEDO GULF.

VARIATION, from 3° 20′ W. to 5° 40′ W. in 1884.

JAPAN ISLANDS.[*]—The empire of Japan is composed of four large islands, Kiusiu, Sikok, Nipon (Honshiu) and Yezo, and numerous smaller islands; extending about 900 miles north and south, and having an area of about 148,700 square miles. Honshiu, more commonly known as Nipon, the largest and most important of these, and that which gives its name to the whole empire, is more than 700 miles in length N.E. and S.W., and its breadth varies from 50 to 150 miles. South of Nipon, and separated from it by a narrow channel, is Kiusiu, about 180 miles in length, north and south, and about 80 in average breadth.

Lying north-east of Kiusiu, and eastward of the south extreme of Nipon is the island of Sikok, about 130 miles in length N.E. and S.W., and 60 in breadth. It is separated from Kiusiu by the Boungo channel, and with Kiusiu and the western part of Nipon forms a basin or inland sea, known as the Seto Uchi. This sea communicates with the Pacific ocean by the Kii channel to the east of Sikok, and by the Boungo channel to the west of it, and with the Japan sea by the strait of Simonoseki. North of Nipon, and separated from it by the strait of Tsugar, is the large island of Yezo, a conquest and colony of Japan; its form is that of an irregular triangle, and its area is computed at 30,000 square miles. The island of Saghalin, which is separated from Yezo by La Pérouse strait, was in 1876 wholly assigned to Russia, the Japanese receiving in exchange the northern Kuril islands, the whole of which now belong to Japan.

The Japanese islands are exceedingly broken and mountainous, with numerous peaks, the principal of which are Fusi yama, or Fuji san, in lat. 35° 21′ 5″ N., long. 138° 43½′ E., a magnificent mountain, the summit of which (the crater of an active volcano) attains an elevation of 12,450 feet above the level of the sea, and is an excellent landmark for vessels approaching the gulf of Yedo. Mitake, 9,000 feet; Asama, 8,500; Chokai,

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[*] *See* Admiralty chart:—Nipon Island, Kiusiu, and Sikok, and part of the Coast of Korea, No. 2,347; scale, $d = 2\cdot3$ inches.

6,000; and Otai, 5,620, are all volcanoes, active or, for the present, extinct.

The formation and size of the Japan islands prevents their possessing rivers of any pretensions to magnitude, the principal, however, are the Sinana gawa, 180 miles in length, the Tone gawa, 170 miles; the Kitami gawa, 140 miles; the Ishikarri gawa (in Yezo) 130 miles; the Tenriu gawa, 120; the Kiso gawa, 115; the Sakata gawa and the Okuma gawa 110 each, and the Noshiro gawa 100 miles in length.

Japan possesses numerous lakes, the largest of which Biwa, situated north-east of Kioto has an area of 190 square miles; Kasumiga ura 80 square miles, several of from 30 to 15, and many smaller ones; that of Hakone on the west shore of the gulf of Yedo, noted for the great beauty of its scenery, being 3½ square miles in extent.

Japan in her relations with western nations may be said to have remained wholly exclusive up to the year 1853, when Commodore Perry executed a treaty with the Taikuns government on behalf of the United States. Europeans, however, first visited Japan about the middle of the 16th century, the Portuguese establishing a trading station in the island of Hirado, near Nagasaki. In 1858 treaties were concluded between the government of Japan and those of Great Britain, France, and the United States, which had the effect of opening certain ports of Japan to foreign commerce.

Treaty ports.—The following are the ports opened to British subjects by treaty between Her Majesty the Queen of Great Britain and Ireland, and the Mikado of Japan:—Kanagawa,* in the gulf of Yedo; Nagasaki, on the west coast of Kiusiu; Hiogo and Oosaka, in the Isumi nada (eastern part of the Inland sea); Niegata, on the north-west coast of Nipon; and Hakodate, on the south coast of the island of Yezo.

Trade.—The total exports and imports for the year 1881 amounted to 12,338,211*l.*

In 1879 foreign trade showed an increase of 76,600*l.* over the preceding year; by far the largest proportion of commerce being attached to the port of Kanagawa. There was a large increase in the export of raw silk and tea, and the cultivation of wheat was being much extended. 708 foreign vessels (of 641,880 tons) visited the open ports in 1879, against 838 (of 748,872 tons) in 1878.

Pilot Regulations.—All pilot boats are painted black, with the words "Licensed Pilot-boat," and the number, in Roman letters, on the stern of the boat, and on the upper part of the large sail.

When licensed pilots are on board, the pilot-boat will fly a pilot flag by day, and by night carry a bright white light at the masthead, and exhibit, every fifteen minutes a flashing light. The ordinary side lights will also be displayed. Vessels requiring a pilot should, by day, hoist the union jack or the national flag at the foremast head; or the letters P.T. of the International Code. By night a green light should be shown every fifteen minutes, or a bright white light, at intervals of about a minute, over the side on the upper deck. A copy of the Japan Pilot Regulations is furnished to each licensed pilot, who is instructed to produce them when required by his employer.

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* This port includes Tokio (Yedo) and Yokohama.

Storm Warnings.—Warning of approaching storms on the Japan coast is issued by the Meteorological Office at Tokio, and the following signals are exhibited at the principal ports:

For storm approaching, the direction of which is not precisely known.—A ball, or at night a red light.

Storm from Northward.—One cone with apex up, or by night 3 red lights, one above and 2 below.

Storm from Southward.—One cone with apex down, or by night 3 red lights, two above and one below. The signal staff is painted red and white in horizontal bands.

SOUTH AND EAST COASTS OF KIUSIU.

SATA NO MISAKI (cape Chichakoff), the southern point of the island of Kiusiu, is bold and rocky, rising steeply to a wooded range 750 feet in height, the mountains at the back, from which it is a spur, rising to a considerable elevation, and culminating in Nakubi yama, a peak 2,948 feet high, at 10 miles N.N.E. from the lighthouse.

Oki no Kodoushi, a small islet about 300 yards across, lies 1½ cables southward of the cape, and there are also several small detached rocks close around its base, none of which, however, extend more than 2 cables from it. This cape is well known to vessels trading to Japan, and has attained celebrity from the fact that almost constant bad weather is experienced in its vicinity, violent gales with a thick murky atmosphere rendering the passage through Van Diemen strait at times somewhat perilous. Heavy tide races occur off the cape.

LIGHT.—From a lighthouse situated on Oki no Kodoushi, at an elevation of 200 feet above the sea, is exhibited a *fixed* white light of the first order, visible seaward between the bearings of S.S.E. ½ E. (through East and North), and S.W. by W. ¾ W., and should be seen in clear weather from a distance of 21 miles. The lighthouse is 32 feet in height, constructed of iron, octagonal shaped, and painted white.

Mira no sima, a small wooded islet, 166 feet high, lies 2 cables off shore, at three-quarters of a mile north-east of Sata no misaki.

The COAST for 140 miles to the north-eastward, comprising the whole of the east coast of the island of Kiusiu is comparatively unknown;

between Sata no misaki and He saki it is chiefly composed of densely wooded mountain ranges, (the highest peaks of which in some places exceed 3,000 feet in elevation), rising precipitously from the sea, and interspersed with a few small sandy bays; it is free from off-lying dangers. From Kayeta saki the mountain ranges strike further inland, and thence as far as lat. 32° 12′ N., the coast from the offing has the appearance of a low sandy beach fringed with trees. Northward of the above latitude the hills again approach the coast.

From Sata no misaki lighthouse the coast immediately eastward is steep and rocky, broken by small indentations and bays, as far as Haya saki. About one mile from the lighthouse is a bay, 8 cables wide at its entrance, and a little more than half a mile in depth, with a sandy beach at its head. The ground, however, is foul inside and for some distance from the shore, affording no facilities as an anchorage.

ODOMARI BAY, 2 miles eastward of Sata no misaki, is separated from the above mentioned bay by a straight sandy beach one mile in length; it is nearly half a mile wide at its entrance and is about the same distance in depth, with an average width of 3 cables widening to half a mile, where there is a sandy beach at its head, and on the north-east extreme of which is a village. The shores are steep-to at a quarter of a cable's distance, and the bay affords excellent shelter (for only two vessels) from northerly and north-westerly winds, which prevail during the winter months. At this season there is room for a vessel of moderate size in 5 to 6 fathoms water just inside the rocky points where the bay begins to widen; and also for a second and larger vessel in 11 fathoms, with the north-east extreme of the coast of Kiusiu, which is visible in line with the opening between a rock above water and Haya saki.

With southerly winds, or between April and October, the inner anchorage should not be used, and vessels should put to sea if there should be any indications of bad weather from that quarter. The bay is of little use, except for steam vessels, as the strong southerly set sometimes experienced along the coast would prevent sailing vessels from approaching it safely.

Supplies.—A few fowls and eggs may occasionally be obtained.

Directions.—Odomari bay may be easily recognised from the offing in consequence of the dip in the hills over the head of the bay, and from a distance the land to the southward has the appearance of an island. Entering the bay in clear weather, the summit of O Kaimondake (mount Horner) will be seen bearing about N.W. ½ N., and will dip behind the summit of the grassy hill at the head of the bay, a few cables before the outer anchorage is reached. The bottom is sand, and the holding ground is good.

Tides.—It is high water, full and change, at Odomari bay at 6h. 48m.

HAYA SAKI, 4 miles eastward of Sata no misaki, is a rocky point, off which is a pinnacle rock, and several others above water.

Ohobama.—The only white sandy beach between Sata no misaki and Kanon saki is that of Ohobama, which is fringed with trees in the back ground, and opens of the point to the south-east of it when bearing W. by N. ½ N. There is much cultivated land on the hills in the vicinity and houses may be seen. There is also a black and red pillar visible.

Betska bay, nearly midway between Sata no misaki and Ohobama, has a dark sandy beach, with trees at the back.

KANON SAKI is a bold headland projecting slightly from the general line of the coast; it may be passed close to in safety, there being a depth of 20 fathoms within a few yards of the shore.

On a nearer approach Kanon saki may be known by a deep cavern having a square entrance like a doorway, which appears open when bearing N. by W. ¼ W.

Immediately to the north-eastward of Kanon saki are two small bays in both of which are villages, separated from each other by a narrow rocky promontory (To saki). The southern bay has a white sandy beach; both are deep, open to the southward, and afford no anchorage.

OYAMADA, is an open bay, with a white sandy beach, about 4 miles north-east of Kanon saki; it is entirely open to the southward and eastward, but in fine weather anchorage may be obtained in it in 10 fathoms, sandy bottom.

Tori sima, a rock 76 feet high, lies about 1½ cables from the southern point of Oyamada bay.

HE SAKI, a prominent, bare point, 786 feet high, is about 6½ miles north-east of Oyamada. There is deep water close to it on all sides, and it may be easily recognised by a conspicuous landslip on its eastern side.

TOI NO MISAKI is a steep, bluff headland, composed of bare hills, 982 feet high, and may be recognised when approached from the north-east by three remarkable knobs of trees on its summit; and by the flat sloping topped mountain, Komatom yama, which is about 20 miles to the northward. When first seen, the cape has the appearance of being the outer and lower of three islands. The extreme point is covered with fir trees and it has a precipitous face.*

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* It is proposed to erect a light on this point.

Oge no se.—Several detached rocks lie off Toi no misaki, some covered and others above water. On the eastern side of the point they extend about 2 cables, and on the southern to nearly 6 cables from the beach. The outer rocks on the south side are named Oge no se.

The land to the northward of Toi no misaki is well wooded; so also are the islands Ko sima, Tori sima, Chiku sima, and Oo sima.

Osprey breakers, a danger reported in 1864 to exist in lat. 31° 27′ N., long. 131° 40′ E., has not since been seen.*

ARIAKI NO URA is an extensive bay formed between He saki and Toi no misaki, about 11 miles in depth, in a north-westerly direction, and 8 miles broad. The northern and southern shores are mostly rocky, but the north-west shore is a sandy beach, about 9 miles long, nearly straight and moderately steep-to, on which a surf breaks almost continuously.

Biro sima, a small, wooded islet, 305 feet high, is situated about 2½ miles from the coast in the northern bight of the bay.

Uchi no ura, a small bay immediately north of He saki affords anchorage off the village of Minami Kata, in 10 fathoms; it is, however, exposed to easterly winds.

Anchorages.—Ariaki no ura, being quite open to the south-eastward, affords no protection from the most dangerous winds that blow on this coast (between south and east), but excellent shelter may be obtained from the hard northerly and westerly gales which prevail during the winter months, anywhere off the sandy beach, forming the north-west shore of the bay, in from 5 to 7 fathoms; off the village of Niskata in 6 to 10 fathoms; or in the bay immediately west of Toi no misaki in 10 to 14 fathoms.

ICHIKI NO URA, in lat. 31° 28′ N., is partially protected by the islands Tsuki sima, To sima, and Kojima, and may be used as an anchorage except in bad weather from the southward or eastward, when a heavy swell rolls into it.

Rock.—A rock, awash at low water, lies 3 cables from the beach, in the central part of the bay.

ABURATSU HARBOUR, about 13 miles north of Toi no misaki, is the only safe anchorage on the south-east coast of Kiusiu. The harbour is formed by an island (Oo sima) which lies off the coast, and it may be approached either to the northward or southward of the island.

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* It is believed that these breakers were caused by the current overfall, and that they are not danger; as the English, French, and American mail steam vessels' route lie nearly across the position assigned to the Osprey breakers. Overfalls and tide rips are frequently met with off Toi no misaki.

North Channels.—North of Oo sima there are two channels; that between the north end of Oo sima and Koba sima (Big rock) being about 2½ cables wide, has a depth of 9 fathoms in mid-channel. The other channel between Koba sima and Hada Kabi is 4 cables wide and has a depth of 14 fathoms in it.

Rock.—A small rock, awash at low water, lies one cable south of Hada Kabi.

Oo sima, the north-west shore of this island, is rocky, some detached rocks lying at a distance of 1½ cables from the shore.

South Channel.—If approaching the harbour from the southward, it is advisable to pass south of Midzu sima; this rock, 34 feet high, is the outer of the dangers which extend off the south point of Oo sima.

Anchorage.—Vessels of moderate size can obtain anchorage in 3½ to 4 fathoms off the town of Aburatsu in the northern part of the harbour; or in 5 fathoms in the bay of Tanno ura, in the southern part. Vessels of deep draught can anchor in 9 to 10 fathoms at half a mile westward of the north part of Oo sima.

Inside the harbour the depths shoal gradually to 6½ fathoms, in which depth is good anchorage at about 2 cables from the shore, with the south extreme of Oo sima* in line with the rocks on the north side of the harbour.

THE COAST from Toi no misaki to Kayeta saki (cape Cochrane) is slightly indented, with low projecting rocks from nearly all the points along it; and with the exception of Ichiki no ura and Aburatsu the bays are too small to afford anchorage. Near Oo sima a current setting to the northward at the rate of about 2 knots an hour has been experienced.

Between Aburatsu and Udo hana (lat. 31° 38½′ N.) the coast is in some places fronted by rocky ledges which extend nearly half a mile from the shore.

No sima, a small islet connected to the mainland by a low neck lies about 6 miles north of Udo hana; it is 247 feet high, surmounted by a clump of trees, and is generally conspicuous. One mile north of No sima there is a boat harbour formed by rocks.

KAYETA (TO) SAKI (or cape Cochrane) is a low hilly point terminating in a wooded knob 290 feet high, backed by numerous ranges of hills which rise to a height of 2,000 to 3,000 feet not far inland; a reef of rocks extends 3 cables in a north-easterly direction from the foot of the cape. Anchorage may in all probability be found to the north of the cape; but the water is shoal a long way out, a depth of 12 fathoms being obtained at 3 miles from the land.

Nelly rocks (Odo no se) consist of several rocks having over them depths of one to 3 fathoms, and extending three-quarters of a mile in a north and south direction; the central part of this cluster of rocks is situated 3½ miles East of Kayeta (To) saki (cape Cochrane). The channel between these rocks and the mainland is clear of danger, the depth varying from 10 to 15 fathoms.* The surrounding depths vary between 7 fathoms on the north-west side to 20 on the south.

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* The Japanese Government, it is said, intend erecting a lighthouse on this island.

Awa sima, 1½ miles north-west of To saki, is a low densely wooded islet, connected to the mainland by a spit of sand which covers at high water, and is surrounded by rocky ledges which extend from it nearly half a mile in a north-easterly direction.

Kisaki gawa, the entrance to which is only accessible to junks at high water, is about 2½ miles north-west of Kayeta (To) saki. This river appears to be the boundary of the mountainous region the coast to the northward being low and sandy, backed by an undulating plain richly cultivated.

Kamibetu reef in about lat. 32° 18′ 30″ N., is about half a mile in extent, and lies parallel with the shore at about 1½ or two miles off the entrance to what appears to be a tolerably large river; a large town is situated on its banks near the sea. The reef (behind which is an anchorage for junks), consists of a round rock from 15 to 20 feet in height to the northward, south of which is a long ledge from 30 to 40 feet high, sheltering the anchorage from winds between S.S.E. and S.E. by E.

The COAST from Kayeta saki to Kuma sima, a distance of some 38 miles, is a nearly straight sandy beach broken only by the mouths of a few rivers. To within a distance of 11 miles of Kuma sima the coast consists of steep sand cliffs from 100 to 200 feet high, intersected by numerous ravines; inland the country appears to stretch for a considerable distance back as a flat table-land. At this distance from and towards Kuma sima, the land is low and undulating, leaving a considerable tract of fertile country between the coast and the hill ranges, which from Kayeta saki southwards leave the coast.

From Kayeta saki to Kuma sima, at from 2½ to 3 miles from the land, is a depth of 22 fathoms (off Takernabe), steadily decreasing to 15 fathoms to within 3 miles of the former place.

KUMA SIMA or HOSO SIMA harbour (lat. 32° 23′ N. long. 131° 43′ E. approx.) is a secure and well sheltered anchorage for a large number of vessels. It is a narrow creek, the entrance to which is open to the north-east, and thence extends in a westerly direction about a mile to the head of the harbour. A river flows into the head of this creek, and the water shoals at some distance from its mouth. Off the entrance to the harbour there are depths of 14 and 16 fathoms, gradually decreasing as the head of the harbour is approached. During typhoons the winds at East and S.E. are usually the strongest; Hoso sima harbour would thus afford shelter during the season when those storms occur.

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* Lieutenant R. F. Hoskyn, H.M. Surveying vessel *Flying Fish*, 1882.

The creek partially divides a peninsula named Kuma sima, which forms the southern boundary of the bay, south of Akamidsu head.

Abreast the battery on the south side of the harbour the soundings are 6 fathoms, mud, shoaling gradually to the head of the bay, which is quite shoal, and where a vessel in distress might safely be beached. The harbour is apparently clear of danger.

The hills, which rise to about 200 feet on the north side of the harbour, are entirely destitute of trees, and are covered with coarse grass. On the south side, and rising behind the village, the hills are wooded and very picturesque, and at the head of the creek, range upon range rise one behind the other, all wooded and apparently fertile.

Anchorage may be obtained in 6 fathoms (mid-channel) immediately on opening out the village, but there is here only just room for a vessel of moderate size to swing. The harbour is in a measure exposed to easterly winds, though it does not appear that any heavy sea ever rolls in.

AKAMIDSU HEAD, seen from the northward and eastward, slopes gradually in a hog-backed curve from its extreme, and has a small clump of trees on its highest part; it is partially wooded along the slope. From the south-eastward the point rises to a range of hills of moderate height, the highest being a round grassy hill with a conspicuous clump of trees on its summit.

Birro sima is a small wooded islet lying 1½ miles due south of Akamidsu head, and is the outer of the several islets and rocks in the neighbourhood.

Tasman bay, 1¼ miles from Birro sima, is an open bay, exposed to the full force of wind and sea. The soundings gradually shoal towards the beach, off which, at three-quarters of a mile, is a depth of 6½ fathoms, where a vessel can anchor in fine weather.

The COAST northward of Akamidsu head, between it and Otake, forms a bay with indentations in the coast at both its north and south ends. The head of the bay consists of two sandy beaches divided by a spur of land, on the summit of a hill not far from the extreme of which, there is a clump of trees; the bay appears shoal at its head, and a river flows into its northern part.

Making this bay from the south-east, the north extreme of Akamidsu head appears as a low wooded point. A steep fall of an inland range is also a conspicuous object, seen about midway between Otake and the before-mentioned spur, dividing the sandy beaches.

OTAKE is a rounded point rising gradually to an elevation of some 500 or 600 feet. It may be readily known by the abrupt south termination of an inland range of hills which is in line with Otake, when the latter bears about W.N.W. This inland bluff loses its conspicuous form rapidly after being brought to bear northward of the above bearing; its features are most remarkable when seen bearing between West and S.W.

Inokushi harbour, in lat. 32° 46′ W., long. 131° 55′ E., is said to be a secure anchorage in all weathers, with good holding ground. From the offing the entrance is masked, but its position is indicated by Fuka sima and Yakata (Yangata) sima.

Yangata sima is wooded, and forms in a peak, on the sea face of which, high up, is a conspicuous landslip.

Sima no ura is an island which, when seen from the southward, terminates at its eastern extremity in a wooded conical hill, joined to the main part of the island by comparatively low land.

Fuka sima is a low wooded islet, abreast which, at from 2½ to 3 miles, there is a depth of 56 fathoms, hard bottom.

AKFUTA SAKI, about 7½ miles N.E. by N. from Fuka sima is a rounded point rising gradually to a height of 800 feet. The slope from the summit to the point is rounded and bare, but immediately west of the point the coast is precipitous. Between Akfuta saki and Sura saki, a distance of 7½ miles, the coast forms a deep bight, much broken and indented, and studded with small islands. For some 4 miles to the westward towards Sura saki the coast is very precipitous.

SURA SAKI is a remarkably bold bluff. Rising almost perpendicularly from the sea it forms a step, and again rises with a bare slope to its summit, on which is a fringe of trees. A heavy tide race is often met with off the cape.

Several islands lie northward of Sura saki within a distance of 3 miles.

KAMATO SAKI, lies 8 miles N.N.E. from Sura saki; when approaching it from the northward a curious pinnacle at its extreme point is conspicuous; but when the cape bears westward of S.W. ½ W., this pinnacle is shut in with the land behind it.

The coast between Sura saki and Kamato saki forms a large bight extending about 10 miles in a westerly direction, at the head of which are several islands and rocks, the largest being O Idi sima.

O IDI SIMA HARBOUR.—A perfectly secure anchorage, sheltered from all winds, is to be found between O Idi sima and the mainland in 8 fathoms, mud bottom. Entering this harbour from the northward, after rounding Kamato saki at about half a mile distant, steer S.W. by S. for the small wooded islet which lies close off the south-east extreme of O Idi sima, and keep it in line with the dip (northern) of the shoulder of a curious jagged hill inland. About half a mile south-east of the above wooded islet is a small island. rather long for its height, having a hole through it; between the two islands is a rock awash. Pass southward of the latter islet (Arch rock) where there is a depth of 20 fathoms, gradually shoaling to 11 fathoms off the south point of O Idi sima; and keeping the shore of that island on board (to avoid the shoal ground which extends from the mouth of a river in the south-west part of the bight), steer about W.N.W. for the anchorage westward of a small islet on the shore of O Idi sima.

O sima, an island about 1½ miles in length N.N.E. and S.S.W., lies about a mile north of the coast of the promontory of which Sura saki is the extreme. A thin fringe of trees extends along the ridge about the middle of the island, the slopes of which are in places well cultivated. The south point of the island is cliffy, and there are a few trees on the slope above the cliffs. Along and off the south-east side of the island a heavy tide rip was observed.

Three islets lie about a mile eastward of O sima; they are all bare and rocky, the southern being the smallest.

Tatausi islet, half a mile north-west of O sima north point, has a single tree on the southern slope.

Between Tatausi islet and O sima is another islet somewhat conical in form, with a thinly planted clump of trees on its summit and down its southern slope; it is otherwise bare. Other small islets lie to the eastward of Tatausi and north of O sima.

Hoto sima.—The coast from Kamato saki trends about N. by W for a distance of 2½ miles to a salient point, whence it again recedes to the southward for about 2 miles, forming a peninsula about three-quarters of a mile wide. Off the salient point is the island of Hoto sima and several other islets and rocks, one of which is a high pinnacle. Between Hoto sima and the point, is a rock awash.

SAGANO SAKI, about 11½ miles N.N.W. from Hoto sima, is the north-east point of the island of Kiusiu. At about 1½ miles from the extreme point the land is indented on both sides, leaving only a narrow neck of land (on which stands a village) joining the extreme point to the mainland, which thus forms a nearly detached mass of land triangular in shape, and 650 feet in height. Between Hoto sima and Sagano saki the coast of Kiusiu forms another deep bight somewhat similar to that between

Sura saki and Kamato saki. The shores of this bight are broken up into several inlets and smaller bights, which, however, have not yet (1883) been surveyed. Numerous small islands and pinnacle rocks lie at varying distances off the coast. (For north entrance to Boungo channel see page 340.)

SOUTH COAST OF SIKOK.

The SOUTH COAST of SIKOK, from Isa saki at the eastern entrance to the Boungo channel, to I. sima at the western entrance to the Kii channel, is also as yet unsurveyed. This coast is about 150 miles in extent, and is divided by the projecting peninsula, of which Muıato saki is the extreme point, into two bights, that to the westward being the deepest. The chart, originally compiled from the Japanese manuscript* represents it as very broken in outline, with several deep indentations which may, when examined, prove useful harbours of refuge; four have been mentioned, two only of which are described as good harbours.

SIMIDSU, is an excellent landlocked harbour, for small vessels, situated one mile north-west from Isa saki. The entrance, which is narrow, has off its eastern shore rocks which extend about 2 cables from it. Over the bay is a uniform depth of 5 to 6 fathoms.

ISA SAKI, the southern extreme of Sikok, is a bluff headland situate on a peninsula which juts from the mainland for 4 miles in a S.E. direction, and is 2 miles wide. Seen from a distance the peninsula resembles a saddle-shaped island; its two peaks are 1,440 feet and 1,500 feet high respectively, the highest peak being to the S.E., and are visible in clear weather at a distance of 40 miles. Mount Kopner, 2,720 feet high, situated 10 miles N.W. from the south-east saddle peak, serves to point out the locality of Isa saki. It is the highest land in the neighbourhood, and as it rises before Isa saki, is frequently mistaken by strangers for that cape. The mount is in lat. 32° 52′ N., long. 132° 52′ E.

SUSAKI and NOMI HARBOURS.—The coast of Sikok between Ootzu saki and Ko sima no hana forms a deep bight $3\frac{1}{2}$ miles wide between these points, and 4 miles in depth, forming two inlets extending to the northward and eastward, in which are the villages of Susaki and Nomi. The shores of this bight are bold; and high mountain ranges, reaching to upwards of 1,000 feet in elevation, skirt the coast. On the west shore is a landslip which shows conspicuously from seaward; in its vicinity are several rocky patches.*

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* The Japanese manuscript, to which reference is frequently made in the succeeding pages, is a native map of the whole empire, projected on a scale of 6 miles to the inch. Wherever tested by comparison with our own surveys it has been found so accurate that great reliance may be placed on it. The general chart, No. 2,347, of the Japan islands, the Korea strait, and Inland sea charts, were originally transcripts of it, but they are being rapidly added to and corrected by our own surveys.

Susaki is a village situated on the western low shore of a long inlet which indents the coast of the above-mentioned bight in a northerly direction, and in which is excellent anchorage, completely sheltered and landlocked. The entrance to the inlet, between Kadoya saki and Yama saki is nearly 5 cables wide, and carries a depth of 7 fathoms. Immediately after rounding Yama saki, however, the navigable channel rapidly narrows to 1¼ cables, when it again widens towards the anchorage. The eastern shore of the inlet is high and steep-to, and should be kept on board the western shore is low and shoal, but the ground rises on rounding the sandy point on which the village is built, where the spurs from Quada yama (a peak 2,390 feet high) reach the coast in hills of about 450 feet elevation. Immediately north of Kadoya saki the Sinjo kawa, a considerable stream, flows into the bay, and between the above points and Susaki a shoal bank of less than 5 fathoms skirts the coast, extending in some places 2¼ cables from the shore. Two pinnacle rocks lie off Yama saki; they are steep-to.

Anchorage.—The usual anchorage is in 7 fathoms, with the landslip on the western shore just open of Kadoya saki, and the low point of Susaki bearing S.W. ¼ S.

The battery (west) just below the temples at Susaki is in lat. 33° 23′ 18″ N., long. 133° 17′ 48″ E.

Nomi harbour, situated in the south-east part of the bight above-mentioned as lying between Ootzu saki and Ko sima no hana, is formed by the projecting peninsula, of which Yama saki is the extreme on the north, and a long narrow peninsula to the south. This peninsula terminates in a fork, with a chain of islands and rocks extending from its extreme point to the westward, Naka no sima and Hey sima being the largest; and this chain protects the anchorage from southerly winds. From the north end of Hey sima a rocky ledge extends 2¼ cables to the northward and eastward. A sunken rock lies one cable from the shore on the west side of this island, and another at the same distance from its south-west shore. Vessels entering either harbour should pass about half a mile westward of Hey sima, and the same distance eastward of two rocks, 10 feet high, lying 4 cables from the landslip.

Ko sima.—The other prong of the fork above mentioned, consists of a chain of islets and rocks which extend to the wooded islet Ko sima in a S.S.E. direction. The islet has a conspicuous clump of trees on its summit.

A rock, which uncovers, lies 1¾ cables to the south-westward of Ko sima, and another at 3½ cables from the south point of the same island.

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* *See* Admiralty plan:—Susaki and Nomi harbours, No. 995, scale m = 3·95 inches.

Breaker rock, a small rock, which uncovers at low water, lies S. by W. ½ W., 1¼ miles from the clump on Ko sima ; it may be passed on the south side at one cable. Vessels entering Nomi harbour should keep the northern shore on board.

Anchorage may be obtained in 10 fathoms off the village of Nomi at 2½ cables from the shore.

NIPON (HONSHIU) ISLAND.

SOUTH-EAST COAST of NIPON.*—From Siwo misaki, the southern point of Nipon (see page 358) the coast trends to the north-eastward for 71 miles as far as cape Sima; the whole of this coast is bold and mountainous, the high coast ranges attaining an altitude of 2,000 feet; the hills are thickly wooded and very undulating, those immediately in the vicinity of the coast being steep and conical shaped. The portion of the coast between Oö-sima and Ura-kami harbours is fringed with off-lying rocks, and the wooded hills over this part are not so high as those further north. When abreast Arundell point, the north-east point of Ura-kami harbour, the coast for a distance of 28 miles north-eastward as far as Ishimo saki will be plainly visible in clear weather. Ugui mura point lies 4½ miles N. by E. ¾ E. from Arundell point, the coast line between being indented with bays and many isolated rocks. Kats ura, situated midway between the two above-mentioned points, is, from the diversified nature of the surrounding country, a picturesque little harbour ; high dark cliffs form its east side, and lofty wooded mountains, about 3,000 feet high, extend north-west. In a valley, at an elevation of 1,190 feet, there is a cascade, 275 feet high, visible from seaward between the bearings of N.W. ¾ N. and N.W. by W. ¼ W. Bosichi yama, 2,952 feet high, and bare of trees on its eastern side, lies N.N.E. of the waterfall. Taka yama, 1,455 feet high appears sharp from the south-eastward ; and a conical peak, 1,002 feet high (nearly 2 miles north of Kats ura), is conspicuous from the north-eastward.

From Ugui mura to Mitarai saki, a distance of 2½ miles, the coast is indented and rocky, with a junk anchorage off Miwazaki mura.

From Mitarai saki to Ijima hama, a distance of 12¾ miles, is a continuous steep shingle beach, with an average depth of from 7 to 15 fathoms at a distance of half a mile from the shore. The country behind this coast is high and mountainous, being intersected by many rivers and valleys; amongst the former is Otonashi gawa, on whose banks is situated the large and opulent town of Singo, formerly the residence of a daimio ; the valleys are highly cultivated and studded with villages.

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* *See* Admiralty charts:—Kii channel to Yedo, No. 996 ; scale, $m=0·16$ inches ; and Kii channel to Owasi bay, No. 951, scale $m=0·5$ inches.

From Ijima hana to Ishimo saki the coast is indented with bays, three of which, Odomari mura, Atashika ura, and Kada bay, afford anchorage. Of these Kada bay is preferable, as it is secure from all winds, whilst the others are open to the southward. The hills, most of which are densely wooded, rise steeply immediately over this part of the coast, attaining a great height.

From Ishimo saki, in clear weather, the coast as far as cape Sima, a distance of 36 miles is visible ; the most remarkable objects are the high mountains northward of Owasi bay, where the summit of Otai yama attains an elevation of 5,620 feet; the wooded peak of Ö-sima, 339 feet high ; a large landslip at the entrance to Koa mura; Miye sima; and two large clumps of trees on the east side of Mura harbour ; as also the high-wooded coast ranges of hills as far as that harbour. From thence eastward the land is low and flat, Goza harbour being readily distinguished by having three small peaks over its south entrance point, which appear isolated when seen from a long distance.

OÖ-SIMA HARBOUR,* a safe and convenient anchorage, is formed between Oö-sima and the east side of Siwo misaki promontory. This prominent headland is connected to the mainland by a low isthmus, and has a flat plateau-like summit. The harbour affords anchorage both in the bay on the south-west side of Oö sima completely sheltered, but the water rather deep ; as also anywhere along the western side of the harbour between the villages of Kusimoto and Hasingui, at 3 to 4 cables from the beach, in 8 to 9 fathoms, mud bottom.

This very eligible harbour is largely resorted to by wind bound junks, and it offers every facility for repairs and replenishing supplies. There are three villages on the shores of Oö sima harbour, two on the mainland, and one on the island. Water is easily obtained from the latter village, it being led down in bamboo pipes to the rocks, which have deep water alongside them. The large village of Kusimoto on the isthmus, is well supplied with all the essentials usually required by the coasting trade. The country in the neighbourhood is prettily diversified by wooded hills and well cultivated valleys.

Anchorage.—A usual anchorage for small vessels is in 4 to 6 fathoms, muddy bottom, and good holding ground off the village of Hasingui on the mainland in the northern part of the harbour. This anchorage is also well sheltered except from the north-east, and some protection in this direction is afforded by a remarkable chain of rocks, from

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* *See* Admiralty plan :—Oö-sima and Ura-kami harbours, on sheet of plans, No. 356, scale, *m* = 3 inches.

20 to 75 feet high, which extend in a southerly direction half a mile from the shore eastward of Hasingui village; these, however, being detached, and having deep water between them, do not form a perfect breakwater. The best position here is with Itsino sima, the outer rock of the above chain, bearing E.N.E. distant $1\frac{1}{2}$ cables; and Mioga sima bearing South, or in line with Isumo saki, the west entrance point.

The best anchorage for all weathers is off Kusimoto village in 9 fathoms with the north-east point of Mioga sima in line with the south-west end of Tsuya sima (seen through the opening between Mioga sima and Oö-sima west point), at 4 cables from the beach.

OÖ-SIMA, which forms the eastern shores of the harbour, is about $3\frac{1}{2}$ miles long east and west, $1\frac{3}{4}$ miles broad at its widest part, irregular in shape and outline, hilly, and the greater part under cultivation, being only thickly wooded in the ravines, where pheasants are found in great numbers. Its flat summit, 535 feet high, is on the northern side of the island.

LIGHT.—On the east point of Oö-sima (Kashi no saki), from an elevation of 130 feet above the sea, is exhibited a white light of the second order, which *revolves* every *half minute;* visible in clear weather from a distance of 18 miles. The light is seen from seaward between the bearings of N.E. $\frac{3}{4}$ N. (through North and West) to E. by S. $\frac{3}{4}$ S. The light tower is built of stone and painted white.

Double rocks, situated 2 cables north-east of the east point of Oö-sima are above water; vessels should not pass between these rocks and the point, and in rounding them should not approach them within a distance of 2 cables.

Kami seh rock, a pinnacle, with 1·6 feet on it at low water, lies N.E. $\frac{1}{4}$ E. $1\frac{7}{8}$ miles from the lighthouse on Kashi no saki, and E. $\frac{1}{2}$ S. $2\frac{8}{10}$ miles from Kuro sima rocks; it has deep water close round it, and the sea breaks only on it when a heavy sea is running.

Oö-sima summit bearing S.W. by W. $\frac{1}{4}$ W. leads 7 cables north-west of Kami seh rock; Oö-sima east point lighthouse bearing S.W. $\frac{1}{2}$ S. leads $2\frac{3}{4}$ cables westward, and that lighthouse bearing S.W. by W. leads the same distance south-east. Itsino sima, the southern of the remarkable chain of rocks in Oö-sima harbour, in line with the small rock off Omi saki, bearing W. $\frac{3}{8}$ N., leads 7 cables southward of the rock.

Tsuya sima, on the eastern side of the southern entrance to Oö-sima harbour, is a rocky islet, about 120 feet high, lying off the south-west point of Oö-sima, the narrow passage between which and the island can only be used by small junks. In shape it is triangular, and fringed by shelving rocks, which dry on the north shore a short distance;

but on the other sides to about 1¼ cables from the high-water line. A rock, awash at low water, lies 1⅓ cables W.S.W. of the west point of Tsuya sima; and when passing this island care should be taken not to bring the west point of Mioga sima to bear westward of N.W. ½ N.

Mioga sima, 110 feet high and 300 yards long, covered with grass, lies off the west point of Oö-sima within the harbour, and one mile N.W. by W. from Tsuya sima; the channel between it and Oö-sima, only one cable wide, should not be attempted by vessels, as there are several rocks in it. A ledge of rocks extends one cable from the south shore of Mioga sima. Between the west extreme of Mioga sima and the promontory is a channel, one third of a mile wide, in the centre of which is a depth of 16 fathoms.

Katsu sima, lying 1½ miles north-east of the northern entrance to Oö-sima harbour and 4 cables off shore, is well wooded, and is the only islet of this description in the immediate vicinity. It is 115 feet high, cliffy, and surrounded by off-lying rocks, most of which, however, are above water. A patch lies 3 cables south of the islet.

Kuro sima rocks, two small rocks, 15 feet high, with foul ground off their west side, lie S.S.E. ¼ E. a little more than half a mile from Katsu sima; the bottom round these rocks is uneven and rocky, and a patch of 5 fathoms lies S. ½ W. 2¾ cables from them.

The channel between Kuro sima and Katsu sima should not be attempted except in case of emergency.

Supplies.—The cargoes of the windbound junks that visit Oö-sima harbour consist chiefly of rice, sugar, tobacco, charcoal, salt, sake (spirits), and dried fish. Poultry and vegetables can be procured at reasonable prices; and bullocks, deer, and wild boar occasionally may be obtained.

Directions.—Southern entrance to Oö-sima harbour.—To clear the dangers extending from the south shore of Siwo misaki promontory, do not bring the south-eastern extreme of Oö-sima (the most southern point seen) to bear eastward of E.N.E. until the west point of Mioga sima is seen well open of Isumo saki (the western entrance point) bearing N.N.W. ½ W., when the former may be steered for; taking care not to bring it north of that bearing until within a distance of half a mile, or until the east extreme of Isumo saki bears S.S.W. ¼ W., when alter course to N.W. ½ N., and proceed in mid-channel west of Mioga sima, after passing which islet steer for the anchorage off Hasingui. If compelled to work in, the eastern shore is the clearest, but in standing towards Tsuya sima take care not to bring the west point of Mioga sima to bear west of N.W. ½ N., to avoid the isolated dangerous rock, awash at low water, lying 1⅓ cables W.S.W. of the west point of Tsuya sima.

The south-west bay on Oö-sima is clear of danger. When standing towards the west entrance point the west extreme of Mioga sima must not be brought to bear north of N.N.W. ½ W. Northward of Mioga sima the lead will give warning when approaching the mainland, but Oö-sima is steep-to.

Northern entrance.—Approaching the northern entrance of the harbour from the north-eastward by day, Oö-sima flat summit bearing S.W. by W. ¼ W. is an excellent mark to steer for, as it leads 7 cables north-west of Kami seh rock, and parallel with the mainland, off which are numerous scattered rocks only showing at low water, some being more than half a mile from the shore. The above course should be continued until the lighthouse on the east point of Oö-sima bears S. ½ W., when Omi saki the north point of Oö-sima, may be steered for bearing W. by S., which will lead 2¾ cables south of a 5-fathom patch situated S. ½ W. the same distance from Kuro sima rocks. The small rock off Omi saki may be passed quite close to, after which steer westward so as to give the south extreme of the chain of rocks off Hasingui a berth of half a cable, and thence to the anchorage in 6 fathoms, 1½ cables W.S.W. of it.

At night by keeping the *revolving* light on Oö-sima east point bearing westward of S.W. a vessel coming from the northward will pass well clear of Arundell point and the coast south-west of it.

Kami seh rock is the only danger to be avoided; Oö-sima east point light bearing S.W. ½ S. leads 2¾ cables north-west, and bearing S.W. by W. leads the same distance south-east. It is recommended to steer so as to pass eastward of Kami seh rock, and thence between it and Double rocks off Oö-sima east point; after which steer West to pass close to the small rock off Omi saki, whence a course W. ½ S. will lead to the anchorage.

Tides.—It is high water, full and change, in Oö-sima harbour at 6h. 50m.; springs rise 5 feet, neaps 4 feet.

KOZA GAWA is a small town situated on the east side of the entrance to a river, 6 cables northward of Katsu sima. This river has a shifting bar, but a channel, generally defined by breakers, on either side, is always available for small junks. It is the best harbour on the coast for a small vessel to ride out a typhoon in.

At the north extreme of the town is an extensive timber yard, in which are spars of considerable dimensions.

Koza gawa is the seat of an important whale fishery; the mode of capturing is to entangle the whale in a net with small meshes, and then destroy it by harpoons, the spear heads of which weigh 12 to 15 pounds.

Supplies.—Poultry, fish, rice, &c. in small quantities can be obtained; also spars, balks of hard wood, and charcoal.

Caution.—The shore of the mainland should not be approached nearer than three-quarters of a mile, between Koza gawa and Ura-kami harbour as there are several rocky patches in this neighbourhood.

URA-KAMI HARBOUR,* situated 6½ miles N.E. by N. from Oö-sima east point, and 1½ miles south-west of Arundell point, is 1½ miles deep in a W.S.W. direction ; although small it affords excellent shelter in 4 to 5 fathoms, over stiff muddy bottom. For steam vessels it offers admirable shelter, but being only one quarter of a mile wide, sailing vessels might experience difficulty in entering, as from the direction of the valley at the head of the harbour the wind, which may be fair outside, is frequently at he entrance found to be blowing directly out.

When entering, take care to avoid a spit of rocks projecting about half a mile in an east-north-east direction from the south entrance point. One of these (Hive rock) is 36 feet high, and some are covered, but are sufficiently apparent to be easily avoided.

Anchorage.—The best anchorage is in 4 to 5 fathoms off the east extreme of Ura-kami village, which stands on the south shore about half a mile from the head of the harbour. For small vessels this harbour affords excellent shelter from a typhoon.

Supplies.—The usual supplies, consisting of a few fowls, fish, rice and small quantities of vegetables and water are also to be obtained here.

Tides.—It is high water, full and change, at Ura-kami harbour at 7h 30m. ; springs rise 6 feet, neaps 4 feet.

Arundell point, the north entrance point of Ura-kami harbour, when seen from the north-east, may be recognised by the land over the point having a gentle slope ; a tall solitary tree, one-third of a mile from the point, on a ridge 166 feet high, is a conspicuous object, as is also a wedge-shaped rock, 20 feet high lying one cable north-east of the point.

Arundell point is rocky, with low cliffs and shelving rocks which dry out from high-water mark to a distance of from 50 yards to one cable.

Rock.—A rock, awash at high water, and on which the sea is seen generally breaking, lies S.S.E. ½ E. 2¾ cables from Arundell point, and N.E. by E. ¾ E. 1¾ miles from Hive rock ; there are depths of 15 fathoms near it, and 30 fathoms 3 cables eastward.

Tomio saki is the north termination of Arundell point, the coast then curving south-west to the village of Taize. Eastward of this point for 1½ cables are many small rocks, above and below water, to avoid which, Black rock (lying N. ½ E. 6¾ cables from Tomio saki) must not be brought to bear north of N.N.W. ½ W.

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* *See* Admiralty plan:—Ura-kami harbour, on sheet of plans, No. 356, scale $m = $ 3 inches.

TAIZE URA,* two bays westward of Tomio saki (Arundell point), are rendered useless as anchorages in consequence of the numerous dangers with which they are studded. There is, however, completely sheltered anchorage for small vessels in Kats ura immediately north of Taize ura.

KATS URA is a small and sheltered harbour, protected on the southern side by a small islet, and to the eastward by a point three-quarters of a mile long by 200 yards broad, on the east side of which are high dark cliffs, from 278 to 160 feet high; southward of this point are high pinnacle rocks, and two small islets, having boat channels between them. The peculiarity of the high cliffs with numerous pinnacle rocks and sharp peaks in the vicinity of Kats ura readily attract notice, as there is nothing similar in the neighbourhood. The harbour has a depth of 3 to 6 fathoms, sand and mud bottom, the only danger being a small cluster of rocks, awash at high-water springs, lying three-quarters of a cable from the eastern shore.

The small islet on the southern side forms two channels, but only the eastern is navigable for vessels; it is 125 yards wide, and has a depth of 9 fathoms in the centre, with deep water close-to on either side.

A village is situated on the northern side of the harbour; two hot sulphur springs and baths are on the east shore, and are much resorted to by the natives for the cure of rheumatism. On the south shore is another mineral spring of cool water.†

Supplies.—Fish, poultry, rice, and potatoes are easily obtained at moderate prices. Large junks load with coal of an inferior quality, which is brought from Singo, a town on the river Otonashi.

Bluff point, the south point of the islets southward of Kats ura, is a black point steep-to; and vessels entering or leaving the harbour must pass close to it to avoid dangerous rocks lying one quarter of a mile to the southward.

Black rock, 20 feet high, 6¾ cables N. ½ E. from Tomio saki, and S.E. ⅛ E. 6 cables from Bluff point, is isolated, having deep water round it; it is an excellent mark to steer for when entering Kats ura from the south-eastward.

Tera sima.—Half a mile eastward of Kats ura is a cluster of rocks named Tera sima, 2 cables in extent, the highest being 83 feet above high water. The passage between the mainland and Tera sima should not be attempted.

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* *See* Admiralty plan:—Taize ura and adjacent bays, on chart, Kii channel to Owasi bay, No. 951, scale $m = 1{\cdot}75$ inches.

† About 4½ miles up the winding valley down which the river runs (afterwards entering the sea just north of Kats ura) is a magnificent waterfall, with a sheer fall of 275 feet.

Ugui mura, a small bay, available for boats, lies 2 miles northward of Tera sima; a rocky peninsula forms the east side with small rocks, 10 to 15 feet high, off its south extreme, and two rocks 60 and 25 feet high, off its north-east extreme.

Directions.—Approaching Kats ura from the south-east, proceed towards Black rock bearing westward of N.N.W. ½ W. to pass east of the rocks off Tomio saki. Pass Black rock close-to on either side, and then steer N.W. ¼ W. for Bluff point, and rounding this point at a distance of half a cable, proceed through the east channel into the harbour, anchoring in 6 fathoms, midway between the islet on the south side of the harbour and the rocks awash at high-water springs, which lie three-quarters of a cable from the eastern shore, the latter bearing N.N.E. distant 1¼ cables. A depth of 5 fathoms will be obtained close outside the entrance when west of the pinnacles.

Caution.—When passing Bluff point care is necessary to avoid a sunken rock, with less than 6 feet water on it, which lies 2½ cables S. ¾ W. from the point. This danger is the outer of several, which extend off the dividing point in Taize ura.

When entering the harbour from the north-east, pass eastward of the outer rocks, 15 feet high, situated southward of Ugui mura peninsula, and when abreast Tera sima steer for Bluff point, bearing about W.S.W.; round the latter at a distance of half a cable, and then proceed as before directed.

Anchorage.—Large vessels seeking shelter from N.W. winds will find anchorage in the bay northward of Kats ura in 10 fathoms, with the west point of Tera sima bearing S. ½ E., and the south extreme of the outer rocks to the eastward, bearing E.S.E.

Miwazaki mura, is a large fishing village, situated on a sandy point, at the foot of Taka yama, a sharp bare peak 1,455 feet high; close to the point are two small islets, the southern of which (Ko sima) is only 15 feet high, composed of shingle, and surrounded by shelving rocks and off-lying dangers.

Tozu sima, the northern of the two, is much higher with two pinnacles. Junks anchor between these islets and the point. The outer danger off Ko sima is a rock that covers, situated 9 cables N.N.E. from the extremity of the outer rock off the north-east extreme of Ugui mura peninsula.

Mitarai saki, a rocky point with dangers extending nearly 2 cables off it, is the southern extremity of a shingle beach which extends 12¾ miles in a N.N.E. direction from it. The mountain range inland of this point attains an altitude of over 3,000 feet.

OTONASHI GAWA.—The mouth of this river 2½ miles north east of Mitarai saki, may be recognised by a few small rocks, 15 feet high, off its north point. On the southern bank, 1½ miles from the entrance, is the large town of Singo, formerly the residence of a Daimio, whose castle, situated in front of the town, is now in ruins; its white towers, seen between the trees, are, however, conspicuous from the offing.

Singo is the emporium of a large coasting trade, carried on by junks, consisting chiefly of timber, and coal of an inferior quality, brought down the river in flat-bottomed boats.

Behind the town is a rocky ridge 810 feet high, and the river on the north side of this ridge has a sharp turning.

The COAST.—Eda yama, a sharp peak 1,166 feet high, situated one mile from the coast and 2¼ miles north of Otonashi gawa, is a useful mark to vessels. From this mountain a chain of hills continues in a N.N.W. direction for a distance of 3¼ miles to Kazefuki yama, 1,952 feet high (the summit of the range), on which are a few trees.

Rock.—Nearly midway between Otonashi gawa and Ijima hana (a distance of 10 miles), at 1½ cables from the beach, is a rock with less than 6 feet water on it, the only known danger along this shingle beach. From the rock, Hiwa yama clump on the north shoulder of a bare hill, 682 feet high, bears N.W. by W. ½ W.; this clump is remarkable. On the beach are situated the large villages of Eda mura, Atawa mura, Ichigi, and Arima, and several hamlets.

Ijima hana is a cliffy point on the north extreme of the shingle beach; one mile southward of it, and 200 yards from the beach is a small peak, 413 feet high, with a whitish cliff. Immediately south of the point, and situated on the sandy beach, is the village of Kinomoto.

Hino hana, a point 8 cables east of Ijima hana, has flat, bare hills over it, 617 feet high.

Marmurika, a rock lying 2¼ cables southward of Hino hana, is 200 yards long, with three hummocks on it, the highest being 70 feet high. A rock, awash at low water, lies half a cable northward of Marmurika.

There is deep water close alongside this rock, but the passage between it and Hino hana should not be used.

Odomari mura, is a village situated at the head of a bay between Ijima hana and Hino hana; in the bay, off its east side, is a small rock, 25 feet high, and on the same shore is a clump of trees, conspicuous from the southward and westward.

Anchorage.—The bay is clear of danger: it opens to the south, and small vessels would find shelter here from northerly winds in about 8 fathoms, sandy bottom, in the centre of the bay, with the above mentioned rock, (25 feet high) in line with the north extreme of Marmurika, 2½ cables distant from the former and about the same distance from the shore on each side.

Sizagoshi sima, 50 feet high, lies 1½ miles N.E. by E. ¼ E. from Marmurika, and 3 cables from the shore; foul ground extends from its southern side, and there is a small rock with dangers surrounding it 2¾ cables N. ¾ W. of this islet. Vessels should never attempt to pass between Sizagoshi sima and the land.

ATASHIKA URA, 1½ miles north of Sizagoshi sima, is surrounded by high land, and is sheltered from all winds except those between S.E. by E. and S.W. by S., and has a depth of from 5 to 11 fathoms, sandy bottom. The village of Atashika is at the head of the bay, and there is also a small village on the eastern shore at the head of a creek; from either village a supply of fowls, rice, and fish can be obtained. Off the south-east point, close to the shore, is the small islet of Mina no sima, about 100 feet high, and off the west side is Yukido sima, 200 yards long and 55 feet high.

Directions.—Approaching Atashika ura from the southward, pass east of Sizagoshi sima at a distance of one quarter of a mile; and from thence steer N. ¾ E. as far as Yukido sima, when alter course to N. by W. for the bay.

When approaching Atashika ura from the eastward, care must be taken to keep outside a dangerous patch of rocks lying E. ¾ S. half a mile from Mina no sima, and 2 cables off shore, with deep water around them. The south points of Yukido sima and Mina no sima kept in line, bearing W.N.W., lead one quarter of a mile southward; and the east extreme of Sasano sima in line with Kosa hana (the west point of Kada bay) leads 3 cables eastward of these rocks.

Anchorage.—Anchor in about 8 fathoms, 2¼ cables from the shore, with the west points of Yukido sima and Sizagoshi sima in line.

Sasano sima.—From Atashika ura a cliffy coast extends eastward as far as Sasano sima, which lies on the west side of Negesima ura, and is 200 yards long and 180 feet high; from seaward this islet is easily recognised.

Tateya saki, on the east side of Negesima ura, is a prominent remarkable headland, with bold rugged cliffs, 586 feet in height.

Negesima ura, a bay between Sasano sima and Tateya saki, is not adapted for vessels in consequence of the depth of water in it being too great. There are two small villages in the bay, and junks secure alongside the sea wall on the western shore.

KADA BAY,* situated between Koso hana and Ishimo saki, is 3 miles long, having on either side an arm, the western of which affords anchorage to vessels, sheltered from all winds. The bay is surrounded by high wooded ranges. Bell peak, 2,520 feet high, having a conspicuous cluster of trees on its summit, is over a sandy beach at the head of the bay. There are several villages in Kada bay, from which a small quantity of the usual supplies can be obtained. Wild boar are frequently killed by the natives.

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* *See* Admiralty plan:—Kada bay on chart, Kii channel to Owasi bay, No. 951, scale $m = 1 \cdot 75$ inches.

At the head of the western arm is a river, off the mouth of which a sand bank dries 2 cables from high-water mark.

Koso hana, is the west point of the entrance to Kada bay, which here is 1½ miles broad, but 9 cables farther in it is only 6 cables.

Ishimo saki, the north-east entrance point of Kada bay, is rocky and cliffy, and when approaching from either south-east or north-east cannot be mistaken for any other point, as it is the eastern extremity of land in the vicinity; the hill immediately over the point is 910 feet high.

Outer rock, 30 feet high, lies S.S.W. ½ W. nearly 7 cables from Ishimo saki, and from its off-lying position this rock is a prominent mark when approaching the entrance to Kada bay; the passage between it and the shore is foul. A depth of 24 fathoms was obtained close eastward of this rock, and 34 fathoms three-quarters of a cable to the southward.

Anchorage.—Anchorage is found nearly at the head of the western arm, where the width is 3 cables, just beyond the point south-east of the village (Kota mura) on the northern shore; and abreast a point on the southern side, on which is a clump of trees.

The water is deep quite close to the north shore, but off the point, with the clump on it, a depth of 3 fathoms will be found at a distance of 1¼ cables; this is the only point in the bay that has shoal water extending from it. The anchorage has a depth of 5 to 10 fathoms, and is sheltered from all winds, but the high land surrounding it occasions heavy squalls down the valleys.

Directions.—When entering Kada bay, either Koso hana, or Outer rock (off Ishimo saki), may be passed close-to, but vessels must not pass between Outer rock and the coast. The centre of the sandy beach at the head of Kada bay bearing N.N.W. leads in mid-channel, and when abreast the arm on the west side alter course to the westward and steer up the centre of this arm, keeping near the northern shore as the anchorage is approached. A good berth is in 8½ fathoms, 1¾ cables westward of the point south-east of the village on the north side (the point on the south side of the entrance to the arm being just open of it bearing E. ¾ N.), and Clump point on the south side of the anchorage bearing S. by W. ¾ W.

KUKI SAKI, the southern point of Owasi bay, situated N. by E. ½ E. 3 miles from Ishimo saki, is a cliffy promontory, and immediately over it, at an elevation of 748 feet, is a small clump of trees. Three-quarters of a mile farther inland is a wooded peak, 1,350 feet high, from which the hills extend westward, connecting with a ridge from Bell peak and also with a ridge from the lofty hills over Owasi bay. A few rocks above water extend about one cable eastward of Kuki saki, with deep water outside them.

KUKI URA.—Between Ishimo saki and Kuki saki the coast forms two bays, the northern, Kuki ura, being 1½ miles deep. There is anchorage for small vessels at the head of this bay, about 1½ cables from the shore, in 12 fathoms. Its narrow entrance, one cable wide, has a depth of 10 to 15 fathoms in the centre.

Domakura saki, a high, cliffy, point on the northern entrance to Owasi bay, has off its south extreme, at a distance of one cable, some conical islets, named Fude sima.

OWASI BAY* is surrounded by high wooded hills, and is 4 miles wide at its entrance between Kuki saki and Domakura saki, and 4½ miles deep, branching into four inlets, two of which are only suitable as anchorages, the remaining two being much smaller and only frequented by junks.

Owasi no minato, the western and main inlet is the largest, and is open to the eastward; the depths in it shoal gradually towards the village of Owasi situated at the north end of the long sandy beach at the head of this inlet.

Yaguchi ura, the next largest inlet, is on the northern shore of Owasi no minato, from which it branches in a N.N.E. direction; it is 3 miles in length, and carries deep water up to the head of the inlet, where it shoals gradually off the village of Yaguchi, affording excellent anchorage in 8 fathoms, completely sheltered.

The Chioshi kawa, a tolerable stream on the western shore of Yaguchi ura, is navigable for boats for upwards of half a mile; on its left bank, a little less than half a mile from its mouth is the entrance to a deep lagoon lying at the back of the villages of Hikimoto and Watari mura, which are situated on the left bank of the river; farther up the inlet is the small village of Naga hama. The Chioshi kawa winds through a valley, the lower part of which is well cultivated, the hills on each side being steep, lofty, and densely wooded.

Waregami sima, a small islet 96 feet high, with a rock immediately south of it, lies 2 cables from the western entrance point to Yaguchi ura. Vessels entering Yugachi ura should pass in mid-channel eastward of it, between it and O Ishi saki.

Sugari ura and Moto Sugari ura, the two other inlets, both of which lie on the northern shore of Owasi no minato, are deep and narrow. At the head of the former, junks moor alongside the sea wall, off the village of Sugari at the head of the inlet.

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* *See* Admiralty plan:—Owasi bay, on sheet of plans, No. 356; scale, $m = 2 \cdot 0$ inches.

In the latter inlet the water is not so deep, but it is not a convenient or sheltered anchorage.

Togashira sima, an island 800 yards long east and west, and 400 yards broad, lies N.N.W. 2½ miles from Kuki saki; it rises steeply on its eastern side to a height of 527 feet, and is covered with trees, showing in bold relief (in the shape of a triangle) against the high land behind it the dark colour of its foliage causing it to be very conspicuous. The west point of the island is 1½ cables distant from the mainland, the passage between being completely blocked by rocks. Off both the north-east and south-east points of Togashira sima, is a small rock above water. On a near approach the appearance of this island is that of a steep cone, and vessels may pass close to it.

Sabaru sima, 6 cables N.N.W. from Togashira sima, is 600 yards long, and narrow. Its south-east point is cliffy, and rises to a height of 304 feet; the north-west point is a steep shingle beach. There is deep water round the island, but a ledge of rocks lies nearly half way between it and the mainland; and vessels should not attempt the channel south of this island.

Hadaka iwa, a small bare rock, 24 feet high, lies 3 cables N.N.W., of the north point of Sabaru sima; there is deep water round it, and vessels can pass on either side.

H'to Te (Man's hand), a rocky pinnacle which uncovers about 2 feet at low-water springs, lies 4 cables S.W. ½ W. from Hadaka iwa, and W. ½ N. 4¼ cables from the north point of Sabaru sima; it has deep water close-to. Between this rock and the southern shore of Owasi bay the depths are irregular, and rocky patches extend about one cable from the coast. Vessels should always pass northward of H'to Te, at a distance of 2 cables, with the north extreme of Tera sima in line with the south extreme of Hadaka iwa, bearing E. ½ N.

Tera sima, two narrow islets 4 cables south-west of Domakura saki, at the entrance to Moto Sugaru ura, are 500 yards long, with steep sides; the western, 169 feet above high water, is the higher. These islets are steep-to, and can be passed on either side.

Supplies.—Fowls, ducks, and vegetables may be obtained in small quantities at any of the villages. Fish are plentiful; also timber suitable for making small spars.

Tides.—It is high water, full and change, in Owasi bay, at 7h. 0m.; springs rise 5½ feet, neaps 2 feet.

Directions.—When entering Owasi bay from the southward, after passing Kuki saki at a distance of about 3 cables, a course N. by W. ¾ W.

will lead a vessel towards the east point of the entrance to Yaguchi ura, passing 1¾ cables east of Togashira sima, and 2 cables from Sabaru sima; when the north point of the latter is in line with Sengin yama (an isolated hill 179 feet high, in the centre of the beach at the head of the bay), bearing West, steer westward so as to pass Hadaka iwa at a distance of 1½ cables on either side.

The channel north of this rock is clear of danger, and a course W. by S. for Sengin yama, which leads to the anchorage off the village of Owasi, can be steered when Hadaka iwa bears South.

The channel south of Hadaka iwa contains the rocky and dangerous pinnacle H'to Te, to avoid which, when entering the bay by this channel, do not open Kuki saki west of Togashira sima until the south extreme of Hadaka iwa is in line with the north extreme of Tera sima bearing E. ½ N.; this latter mark kept on astern will also lead to the anchorage off Owasi, a good berth being in 7 fathoms, mud, with Benten sima bearing S.E. by S. and Sengin yama W. by S. ¼ S.

If intending to anchor in Yaguchi ura, it should be remembered that at the entrance to this bight, abreast the mouth of the river, the channel is narrowed to 2 cables by a small sandy spit on the west side; and off the point, on the east side, a little islet, on which is a shrine, has detached rocks just outside it. This islet (an excellent mark for the channel) should be passed at a distance of about one cable. The only other danger is a patch of rocks that uncover, situated on the eastern shore of the inlet about 1½ cables from the coast and 4 cables from the anchorage, with a small islet bearing S.W. ¼ S. distant 4½ cables. Vessels by keeping nearer the west shore than the east will avoid this danger. The anchorage is in the centre of the inlet, about half a mile from the head, in 8 fathoms.

SASADO SAKI,* lies N.N.E. ¾ E. nearly 2 miles from Domakura saki, the coast between being rocky with high cliffs.

F'ta mata.—This cape may be recognised by two remarkable pinnacle rocks, of nearly the same height, situated 1½ cables to the eastward, named Fta mata; the eastern rock, 87 feet above water, is bare, the western has a few trees on it. These rocks are nearly connected at low water, and surrounded by off-lying dangers with deep water immediately outside; a berth of at least one-third of a mile should be given them when passing, and the passage between them and the cape is foul.

SIMA KACHI URA, a bay one mile westward of Sasado saki may be used by small vessels as an anchorage during westerly winds. The bay has two bights, the southern of which is only 2 cables broad, and contains the village of Sima kachi ura; the northern bight is 4 cables wide, open to the eastward, and has depths of from 6½ to 10 fathoms, sandy bottom. Off the north point are some rocks, the outer being S.E. by E. ½ E., 1½ cables distant.

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* *See* Admiralty chart.—Owasi bay to Takamatsu no saki, No. 952; scale $m = 0 \cdot 5$ inches.

Idzuga sima lies N. ¾ E. distant 1¾ miles from Sasado saki, and is the eastern islet north-east of Sima kachi ura; it is triangular in shape, and 56 feet high.

Daya sima, a cluster of rocks 400 yards in extent with two pinnacles, 83 feet high, lie one mile west of Idzuga sima, and three-quarters of a mile north of the entrance to Sima kachi ura.

In the channel between Daya sima and Idzuga sima are four small rocks 4 feet above water.

Odona sima, a small cluster of rocks, the highest of which is 20 feet above water, lies 4 cables west of Daya sima.

Caution.—Vessels should not attempt to pass between any of the above-named islets, but should pass eastward of Idzuga sima, which has a depth of 23 fathoms at a distance of 1¾ cables from it.

Ö-SIMA, an island, 600 yards in length, north and south, and 250 yards broad, lies 3¼ miles north-east of Sasado saki; its wooded summit, 339 feet high, is a conspicuous mark from seaward. A chain of smaller islets extends 4 cables west of its northern point, the centre islet being high, with a sharp summit; and the whole, nearly connected at low water, are surrounded by off-lying dangers, extending in some places 2 cables from the shore.

Rocks.—Two small rocks, dry at low water and close together, lie half a mile south-west of Ö-sima, the summit of which bears from them N.E. ¼ E., and Sabaru sima, E. by S. ⅜ S., distant 1$\frac{1}{10}$ miles. Deep water is found near them, but vessels should not pass between these rocks and Ö-sima.

Sabaru sima, a black rock, 14 feet high, lying 9½ cables S.E. ½ S. from the summit of Ö-sima, has depths of 11 to 16 fathoms close around; in the channel between the rock and Ö-sima are depths of 9 to 25 fathoms; but vessels should always pass south of Sabaru sima.

Directions.—Entering Sima kachi ura from the southward—round F'ta mata, at a distance of not less than one-third of a mile, and steer westward, passing 2 cables off the southern points of the bay, and anchor in the north bight in 9 fathoms, 2 cables off shore.

If coming from the eastward, Sabaru sima kept bearing E. ¾ N. (astern), leads directly to the anchorage.

If entering from the north-eastward, pass Idzuga sima at a distance of 2 cables, then steer S.W. ¼ W. until Fta mata summit is in line with the north side of Sasado saki, when steer W. ¼ S. for the anchorage. Give the northern point of Sima kachi ura a berth of at least one quarter of a mile; Idzuga sima bearing N.E. just clears the outer danger.

Szu sima, about one mile N.W. by N. from Idzuga sima, and a short distance off the mainland, is square, and may be recognised by its being the highest island in the vicinity; the summit, 349 feet high, over the south point, on some bearings appears sharp.

Mariama islet, 4 cables north of Szu sima, is 195 feet high.

Aka no sima, nearly one mile east of Szu sima, is a cluster of small narrow islets joined at low water, extending north and south for a distance of three-quarters of a mile; the highest, 234 feet above water, is near the south extreme. Several small rocks, above and below water, lie west of the south extreme of Aka no sima, extending 2 cables from it.

The COAST.—The coast west and north of Szu sima, Mariama, and Aka no sima, is indented with many small bays, which are accessible only to boats. Vessels should keep east of Aka no sima.

NAG URA* a bay N. by W., distant 2 miles from the summit of Ö-sima; affords good anchorages for small vessels at all times, but large vessels would not be protected from southerly winds. The approaches to Nag ura when seen from the offing appear to be studded with dangers, but by giving the numerous small islets a wide berth there is no difficulty in entering.

The bay is one mile wide at the entrance; a pinnacle rock (O ishi) 36 feet high, off its east side can be passed at a distance of one quarter of a mile; to the eastward of it are several clusters of islets. Immediately south of the western entrance point, 451 feet high, are two remarkable pinnacle islets, lying east and west of each other one quarter of a mile apart. The western islet is 104 feet high and surrounded by shelving rocks; the other islet connected to the coast at low water, is 163 feet high. At one-third of a mile S.E. ½ E. from the summit of the latter islet is a dangerous patch, awash at low-water springs.

Three-quarters of a mile inside the entrance the bay is only half a mile wide, the western side being foul three-quarters of a cable from the shore, while the eastern coast is steep-to; the bay there trends north-east for half a mile, where there are two small arms, in the southern of which, midway between the two entrance points, a small vessel will find sheltered anchorage in 7 fathoms, mud bottom, one cable from the shore. The northern shore of Nag ura is formed by a shingle beach, on the west side of which are the villages of Naga sima and Nige, with the mouth of a river between them. The valley through which this river runs is well cultivated, with high wooded hills on either side.

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* *See* Admiralty plan :—Nag ura, on chart No. 952; scale, $m = 1·75$ inches.

Supplies.—Rice, vegetables, fish, and poultry can be procured, and the hills abound in pheasants and wild boar.

Directions.—Approaching from the eastward, keep the summit of Szu sima just open south of Aka no sima bearing W. ¾ S., until the west extreme of the Nakamura group bears N. by W. ½ W., when steer W.N.W., which will lead one third of a mile from the east side of the entrance; then alter course to the northward, steering midway between the points, keeping rather towards the east side, and if a large vessel, anchor in 6½ fathoms, sandy bottom, 2¼ cables from the shore, with O ishi rock in line with Momo no saki bearing S.E. ¾ S., and the south extreme of a shingle beach on the northern shore bearing W. by S. ¼ S.

A small vessel may continue on to the north-eastward, keeping in mid-channel, and anchor as convenient, E.S.E. of a round shingle point on the west side, and in the centre of the southern arm, abreast of its entrance points, in 7 fathoms, mud bottom.

Approaching from the south-west the only danger to be avoided is the patch of rocks, awash at low water, lying one-third of a mile S.E. ½ E. from the eastern pinnacle islet (off the west entrance point), and N.E. by E. ¾ E. 1⅙ miles from the summit of Aka no sima. The summit of Szu sima in line with the summit of Aka no sima bearing W. by S. ¾ S. leads one cable south of this danger.

When abreast of Fta mata, off Sasado saki, a N.N.E. course for 4 miles will bring a vessel outside the entrance, passing 6 cables west of Ō-sima; when the wooded summit of that island bears S. by E. ¼ E. steer N. by W. ¼ W., which will lead up the bay to the anchorage.

NAKAMURA is the southernmost of many islets lying eastward of Nag ura, in a cluster 800 yards in extent; the eastern, 118 feet above water, is the highest, and there is a pinnacle, 97 feet high, near the west extreme.

The group is surrounded by dangers; the outer, off its south extreme, is 2 cables distant. The peak of Szu sima, seen just south of Aka no sima, bearing W. ¾ S. leads 3 cables outside the southern danger.

Hirase, 242 feet high, is the highest islet in this vicinity, eastward of Nag ura, and lies 6 cables northward of Nakamura; between them is a pinnacle rock 62 feet high. The channels between these islets are studded with rocks, and can only be used by boats.

NISHIKI URA, situated three-quarters of a mile north-east of Hirase, is 8 cables long, the approaches to which as well as the anchorage itself, contain so many dangers as to render it useless to vessels.

Futago.—Southward of the east point of Nishiki ura, and one mile east of Nakamura, are four small pinnacle islets; the two outer, named Futago, are connected at low water, and are of nearly the same height, the western being 74 feet and the eastern 70 feet above water; the north and centre islets are both 61 feet high.

These islets should be given a wide berth, especially when passing Futago, as dangers exist off their south-west extreme; the outer rock under water, lies S S.W. ½ W. 2¾ cables from the summit of the western and higher Futago, and E. ½ N. 8 cables from the summit of Nakamura. The peak of Szu sima, seen just south of Aka no sima, bearing W. ¾ S. leads half a mile southward of the above dangers and also leads south of the dangers southward of Nakamura.

KOA URA.—A nearly straight coast bordered with cliffs (with a few off-lying rocks), and the wooded hills immediately over which rise steeply to a considerable height, extends for 3½ miles E. by N. ½ N. from Nishiki ura to the entrance to Koa ura.

Koa ura is 9 cables wide at the entrance, and extends, with a width of from 4 to 2 cables, in a northerly direction for one mile; the bay then divides into two arms, in each of which is a small village; the eastern arm trending north-east 8 cables, with an average width of 2 cables, has in the centre a small rock, on which there is a temple.

The western arm extends 8 cables W.N.W., with only a width of 1½ cables; at the head are two small rocks.

The bay is clear of danger, and has deep water in mid-channel, but it is too narrow to be recommended as an anchorage; if a vessel should use it, the best berth is in 11 fathoms, mud bottom, 3 cables from the head of the west arm.

Landslip.—On the east shore of the entrance to Koa ura is a large landslip, conspicuous from seaward between the bearings of N.E. by N. and N.N.W.

The COAST, eastward of Koa ura for a distance of 1¾ miles is bold and cliffy (on which is a small landslip, seen only from the southward), with many detached rocks off it.

The outer rock, 30 feet high, is one cable from the coast; one cable eastward from it is a small rock above water. The rocks are all steep-to, and can be passed at a distance of one cable.

HOZA URA, an inlet on the west side of Sada hana, 2 miles east of Koa ura, and nearly half a mile wide at the entrance, has two narrow arms, one extending 1½ miles in a N.W. by N. direction, in which are four landslips, and at the head the village of Hoza; the other extends one mile in a W.N.W. direction. Both arms are clear of dangers, but being deep and narrow are not suitable as anchorages.

Pearce rock, awash at low water, lies off the western point of Hoza ura, and from its off-lying position is dangerous to vessels entering Naiya ura from the south-west. It lies S.E. 3 cables from the nearest point of land; with Tokin san, a sharp bare peak, 1,640 feet high (over Taskara ura), in line with the first rock outside the conical islet 150 feet high, off Sada hana, bearing N.N.E. ½ E.; and has a depth of 20 fathoms close to its south extreme.

Tokin san kept open eastward of the outer rock off Sada hana bearing N.N.E. ¼ E., leads eastward of Pearce rock.

NAIYA URA, a bay 2 miles east of Koa ura, is 1⅓ miles wide at the entrance, having on the eastern side an island, Miye sima, the peak of which is conspicuous from a long distance. The bay is 2½ miles in depth, with two narrow arms, one extending N.N.E. with the village of Naiya at its head; the other N.N.W. with the villages of Kamizaki mura and Kochi at its head.

In Naiya ura are many small islets, all of which are steep-to, the only danger being the above-mentioned patch of 12 feet.

Sada hana, the west point of entrance to Naiya ura, is a cliffy point, with a sharp peak over its south-west extremity; close to it is a conical islet, 150 feet high, off which are two small rocks 5 and 3 feet above water; and off the north-east extremity of Sada hana are other small rocks above water, the outer being 25 feet high. Deep water is found quite close to the outer rocks off this point.

Tattezaki sima lies one mile within the entrance of Naiya ura where the two arms diverge; it is narrow, 300 yards long, and has a flat top, 123 feet high. This island is surrounded by small rocks, all of which are above water and steep-to; on the north side there is a narrow passage for boats.

Three rocks.—At one-quarter of a mile W. by N. from the south extreme of Tattezaki sima are three small rocks, 3 feet high, with 4 to 9 fathoms water close to; vessels can pass them on either side.

Benten sima lies one cable off the west side of the western arm of Naiya ura, and has two small wooded peaks; there are small rocks round it. The channel on the west side is shallow, but there is deep water quite close to the eastern shore.

Rocks.—A cluster of rocks, 200 yards long, lies nearly in the centre of the east arm of Naiya ura; the southern, 20 feet above water, is the highest. Deep water is found near them, and vessels should pass between them and the eastern shore.

A densely wooded range of mountains, the summit of which is 2,562 feet high, extends 2½ miles northward of Naiya ura.

Tokin san, a sharp peak, 1,640 feet high, immediately over Taskara ura, and having bare slopes fronting seaward, may be easily distinguished from seaward.

Miye sima, an island situated between the two bays Naiya ura and Taskara ura, and forming the eastern entrance point to Naiya ura, is half a mile long, and its south extreme rises steeply from the sea to a wooded summit 494 feet high, easily recognised from the offing. The north extreme is only a short distance from the coast, the channel being blocked by many rocks, with a narrow boat passage between them. Off the southern extreme of Miye sima are detached rocks, all of which are above water, and can be passed close-to, as deep water is found near them.

Furoshimatti, a small cluster of bare rocks, 30 feet high, lie one quarter of a mile west of Miye sima; vessels should pass west of them when entering or leaving Naiya ura.

Supplies.—Fish, rice, vegetables, and poultry can be procured at reasonable prices.

Anchorage may be obtained in either arm of Naiya ura, the eastern having a depth of 3¼ to 5 fathoms, open to S.S.W.; the western arm, sheltered from all winds, has depths of 9 to 14 fathoms, with a patch of 12 feet situated 1½ cables from its eastern side.

Directions.—When entering Naiya ura, Pearce rock, before mentioned, is the only danger to be avoided, and by keeping Tokin san just open eastward of the outer rock off Sada hana bearing N.N.E. ¼ E. a vessel will pass eastward of this rock.

Steer to pass midway between Sada hana and Furoshimatti, and from thence, if intending to enter the eastern arm, steer in mid-channel, passing east of the rocks 20 feet high, situated nearly in the centre of the arm. Anchor in 5 fathoms, mud, 1½ cables from the shore and 4½ cables from the head of the arm, with the summit of the conical islet off Sada hana just touching the west extreme of these rocks bearing S.S.W. ¾ W. The north Twin peak bears from the anchorage N.E. by E., and will be seen over the centre of a small shingle beach, the first on the east side south of the village.

If entering the western arm—when between Sada hana and Furoshimatti, proceed towards Benten sima on a N.W. ½ N. bearing, and when approaching the three rocks (3 feet high) lying one-quarter of a mile west of Tattezaki sima, alter course to pass them on either side, at a distance of about 1¼ cables. When abreast these rocks steer eastward of Benten sima, passing it within a distance of 2 cables, as a low reef of rocks extends 1¼ cables off the north-east shore of the arm.

From abreast Benten sima continue in mid-channel, and when past the shingle point on the south-east side of the anchorage take care to keep the eastern extreme of Benten sima open of this point to clear a shoal patch of 12 feet, lying 1½ cables from the shore. The best anchorage is in 9 to 14 fathoms, in the centre of the arm about 1½ cables from the shore, with Sada hana outer rock in line with the east extreme of Benten sima.

TASKARA URA, a large inlet in which are numerous creeks and small bays, on the east side of Miye sima, is 2¼ miles deep, and open to winds between S.E. by S. and S.S.W. On the east, west, and north-east sides are indentations only fit for boats ; the anchorage is in from 7½ to 9¾ fathoms, off a small wooded islet at the head of the bay in front of the village of Taskara.

A large clump of trees on a hill 744 feet high, over the eastern side of the bay, is conspicuous from the southward and westward. Off the eastern point of the entrance are several rocks, above water and steep-to.

Hitsu sima, are two pinnacle islets lying north and south of each other, a short distance apart, close to the eastern point of Taskara ura. The northern is 140 feet high and wooded ; the southern is 76 feet high, bare, with a single tree on its summit.

Entrance point lies half a mile west of Hitsu sima, and is skirted by off-lying islets ; close to the south extreme of the point is an islet, 95 feet high ; and 3 cables to the southward is another 5 feet high. Westward of the point, distant 4 cables, is the outer rock only one foot above water. All these rocks are steep-to, and vessels should always pass outside them.

Supplies.—There are several villages in this bay, and supplies of rice, fowls, vegetables, and fish may be obtained in small quantities.

Directions.—All the points in Taskara ura have small rocks extending from them, and vessels should keep in mid-channel.

After passing the southernmost rock off Entrance point, Tokin san, kept N. by W. ½ W., leads 1½ cables outside the western rock (situated 4 cables from the same point), and up the centre of Taskara ura ; when near the head of the bay, anchor in from 7½ to 9¾ fathoms (sandy bottom), 1⅔ cables from the wooded islet ; with its summit bearing between N. by E. and N.W. by W.

When entering Taskara ura from the westward pass close to the small rocks off Miye sima, and steer N. by E. ½ E. until Tokin san bears N. by W. ½ W., when keep it on that bearing and proceed as before directed to the anchorage.

TODOMARI SAKI is 2½ miles north-east of Hitsu sima, and between them is a shingle beach about half a mile long. At half a mile eastward of Hitsu sima is a rocky point, off which small rocks extend three-quarters of a cable; the hill over this point is 600 feet high, with a high cliff on its east face, and the summit over Todomari saki is 810 feet high; another densely wooded peak, half a mile farther inland, is 1,025 feet in height. A white patch in the cliff on Todomari saki is noticeable when seen from the south-eastward.

Misaki, the eastern point of Mura harbour, is rocky, having dangers extending 1½ cables off its western face; over the point is a hill 275 feet high.

MURA HARBOUR,* between Todmari saki and Taso saki, is about one mile wide at its entrance, and extends in a northerly direction for 4 miles, dividing in the centre into three arms, two of which on the west have the same entrance, their directions being W. ½ S. and N.N.W. respectively. The eastern arm trends north and east, and is separated from the western arms by a narrow peninsula, having off its south extreme a chain of rocks, most of which are above water, extending for a distance of 3 cables S.S.E. from the point. In each arm are numerous small bights, the anchorage being in the western arms off the village of Hazzama, in 7 to 10 fathoms, mud bottom, well sheltered from all winds. There are numerous villages in this harbour, and over the northern shore are two small conical peaks, and Jeuje yama, a conspicuous bare hill, 1,280 feet high.

The entrance to Mura harbour may be easily recognised from a long distance seaward, by the two, remarkable large clumps of trees, near each other, situated on a hill 565 feet high, at about 1½ miles N.E. by N. from Taso saki, the eastern entrance point.

Kadzura sima, just within the entrance to Mura harbour, about 3 cables from the eastern shore, is 700 yards long by 300 yards broad, and rises steeply on its south and west sides to a height of 222 feet. Vessels must not attempt the channel east of this island.

Sazzara ura.—Over the southern point of the western arm is an isolated wooded hill, connected to the mainland by a narrow sandy spit 300 yards long, on which is situated the village of Sazzara. Rocks extend three-quarters of a cable off this point and 1½ cables south-east of the south extreme of the spit. On its western side is the small bay of Sazzura.

Osima or West rocks.—Southward of Sazzara ura, and 2 cables from the west shore, are a cluster of rocks about 30 feet high; the channel for vessels is midway between these rocks and Kadzura sima, in 11 fathoms.

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* *See* Admiralty plan:—Mura and Goza harbours, No. 994, scale m = 2 inches.

Directions.—When entering Mura harbour, steer in mid-channel, so as to pass 2 cables west of Kadzura sima; from this position a N.N.E. course will lead directly towards the outer rock of the chain of rocks off the northern entrance point to the western arm, and when Hazzama ura village point (immediately under a hill having a clump of trees on it) is in line with Sazzara ura north point, bearing W. by N., alter course to N.W. by N., which will lead in the centre of the channel. Keep on this course until the village of Sazzara ura is seen open to the westward of the point, when steer towards the clump over Hazzama village on a W. by N. bearing, which will lead to the anchorage in 10 fathoms, mud bottom, in the centre of this inlet, 2 cables from the shore.

If wishing to anchor in the arm which runs N.N.W.—after altering course from N.N.E. to N.W. by N., continue the latter course until the west point of Kadzura sima is seen just open east of Sazzara ura point, bearing S. ¼ E.; this mark kept on, astern, for a distance of 4 cables leads to the anchorage in 8½ fathoms, mud bottom, 2¼ cables off shore.

GOZA HARBOUR, situated 3 miles east of Mura harbour, affords shelter from all but westerly winds. The harbour is one mile in width at the entrance, and its general direction is to the eastward, having an inlet, just within the entrance on the northern shore. The whole of the upper part of Goza harbour is divided by islets and rocks into numerous shoal passages and creeks, the whole covering an area of nearly 16 square miles. A few of the creeks nearly meet the sea coast at about 2 miles south-west of cape Sima.

Hamagema ura, the inlet above-mentioned, affords anchorage where small vessels will find excellent shelter from all winds in 5 to 7 fathoms, sandy bottom. A bar, of sand, on which there is only a depth of 2 fathoms at low water, stretches across the entrance to this inlet.

The southern entrance point is a wooded bluff, 310 feet high, eastward of which are two small peaks, 330 and 365 feet high respectively; the eastern of these has a clump of trees on it, a conspicuous mark from all directions. Off the north point of the entrance are many detached rocks and islets, some of them 3 cables distant from the shore.

Anchorages.—There are two anchorages for large vessels, one 9 cables inside the entrance in 7¼ fathoms, sandy bottom, with the highest peak over Todomari saki (Kana yama), just shut in by Taso saki (the east point of Mura harbour) bearing W. ¼ N.; the south point of the entrance S.W. ¼ S.; and the clump peak, Kompira yama, over Goza-mura, S.S.E. ¼ E. The other anchorage is 1$\frac{9}{10}$ miles farther east, in 14 fathoms, mud bottom, with the same peak over Todomari saki in line with Taso saki;

and the west point of Koya-dori island bearing N.E. by E. ½ E. This position is abreast of the second opening on the northern shore.

Tides.—It is high water, full and change, at a village on the north side of Hamagema ura, at 6h. 15m.; springs rise 6 feet, neaps 1½ feet.

Supplies.—From the villages fowls, rice, fish, and vegetables can be procured; the country round the harbour abounds in pheasants.

Directions.—The southern entrance point of Goza harbour may be approached on any bearing eastward of N.N.W., as this bearing leads 4 cables west of the outer reef situated S.S.E. ⅓ E. 5$\frac{2}{10}$ miles from this point. The south point of the entrance, as well as the rocks off the point three-quarters of a mile south-east of it, should not be approached nearer than half a mile; after passing the entrance point steer to the eastward, with the highest peak over Todomari saki in line with Taso saki, bearing W. ⅓ N. This mark kept on, astern, leads up the centre of the harbour to either of the anchorages before mentioned; but when proceeding to the eastern anchorage a shoal bank of 5 fathoms will be crossed after passing the first inlet.

TAIO SAKI or CAPE SIMA is a low, wooded, headland, 8 miles eastward of the entrance to Goza harbour: immediately behind the cape is the village of Namikiri. A conspicuous rock (Taio sima), 35 feet high, lies 3½ cables east from the cape; and it should not be approached within a distance of half a mile.

Mugi saki.—At 3 miles, S.W. by W. ¼ W. from cape Sima is a projecting point of land, with a conspicuous clump of trees on it (88 feet high), and the coast between is skirted to the distance of half a mile from the shore with patches of rocks and foul ground; a rocky ledge also extends 2 cables from this latter point.

O sima and Ko sima, two small wooded islets, 3½ cables apart, lie from 1½ to 2 miles south-west of the point; O sima, the larger and outer, is 40 feet high; Ko sima is 50 feet high. From these islands long reefs and dangerous detached sunken rocks extend in all directions, and on these the sea generally breaks, owing to the constant swell caused by the strong tides off cape Sima.

Outer reef, a rocky patch on which the sea always breaks, uncovers 3 feet at low water, and lies S. by W. ¼ W. 2 miles from O sima; with Jeuje yama just open west of Goza saki, bearing N.N.W. ½ W. The reef extends westward 3 cables of the patch which dries, and has a depth of 5 fathoms on it. Numerous tide rips occur outside this reef, but there are no dangers.

Goza saki, (the wooded south point at the entrance to Goza harbour), bearing N.N.W. leads 4 cables west; and cape Sima rock (Taio sima), bearing N.E., leads 6 cables south-east of Outer reef.

Directions.—When passing Outer reef from the westward, keep Goza saki bearing north of N.N.W. until cape Sima rock bears N.E.; this latter bearing also clears all dangers off the coast.

The COAST.—From cape Sima northward to the entrance of Matoya harbour, a distance of 5 miles, the coast forms an indentation, in about the middle of which, and 2 miles from Matoya, is a sandy beach, 1¼ miles long. For the whole of the distance the shore is skirted by dangerous off-lying rocks, and the hills over the shores are low, and appear flat. The depths off this portion of the coast are irregular.

A rock with less than 6 feet water lies half a mile from the shore N. ¼ W., 6¾ cables from cape Sima rock. There is also a rocky patch of 5½ to 10 fathoms, 6 cables in extent, lying midway between cape Sima rock and Matoya harbour; the shoalest patch 5½ fathoms lies S. ¼ E., distant 2½ miles from Anori saki lighthouse.

MATOYA HARBOUR,* 5 miles north of cape Sima, is open only to the east. Its entrance is 6½ cables wide, between Anori saki on the south and Sungi saki on the north, off each of which points are reefs of rocks, nearly all above water, extending 2 cables south-east of Sungi saki, and nearly one cable east of Anori saki. Immediately within Anori saki, rocks extend northward and contract the navigable channel to a width of 3½ cables; and at a distance of one cable east of the outer rocks above water, is a depth of 10 fathoms.

The harbour is divided into numerous inlets, narrow channels, and bays, and safe anchorage may be obtained in nearly all of them. There is no trade carried on at Matoya, although it is a port of call for junks which seek shelter from stress of weather, often in large numbers.

Watakano sima, an island about half a mile long, of triangular shape, and deeply indented on its west and north sides, lies in the middle of the south-west portion of the harbour. On both the north and east sides of the island are inlets, connected by a channel on the west side of the island.

The south extreme of the island is a narrow point of shingle, a short distance north-east of which is the village of Watakano.

The northern inlet, about 1½ cables wide, leads to the town of Matoya, situated on the north shore, half a mile within its entrance; from the town this inlet has a circuitous course westward, connecting with an extensive shallow lagoon, the head of which is 3 miles from Matoya; this lagoon is the resort of numerous wild fowl. Miya-no-saki, the northern antrance point to the northern inlet, may be recognised by being a cliffy point, with rocks above water extending three-quarters of a cable from it. There is deep water in the centre of this inlet for a distance of 1½ miles west of Miya no saki.

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* *See* Admiralty plan:—Matoya harbour, No. 107, scale $m = 3{\cdot}5$ inches.

O ura (the southern inlet) on the east side of Watakano sima is 1½ miles long in a south-westerly direction; the channel on the west side of Watakano sima, connecting it with the northern inlet, is narrow, having a depth of 4¼ to 5 fathoms in the centre. The village of Sangashiyo is situated on the north-west point of this channel, opposite the town of Matoya.

In the centre of Ō ura there is a depth of 5 fathoms, but abreast the village of Watakano, where the width is 3 cables, a depth of 2¼ to 2½ fathoms will be found at a distance of 1¼ cables from either shore.

Haka sé, a rocky patch which uncovers at low water, lies just within the north point of the entrance of Matoya harbour, one-quarter of a mile from the shore and 7¼ cables West of the outer rock above water off Sungi saki; with Anori saki bearing S.E. ½ S.

Another patch of rocks lies off the east point of Adako ura, and N.W. 3 cables from Haka sé. Between these dangers and the north shore there is foul, rocky, ground.

Oki no sé, a reef situated N.E. ¾ E. 3 cables from the outer rock above water, off Miya no saki, is partly visible at low water; between this danger and Miya no saki the water is shoal.

A rock with 9 feet water over it lies S. by E. from Oki no sé, with Miya no saki bearing W. ½ N., distant 3½ cables.*

Anchorages.—With northerly winds, good anchorage for large vessels may be found in the northern portion of Matoya harbour, in 5½ fathoms, with Anori saki lighthouse bearing S.E. ¼ S., and the outer rock above water, off Miya no saki, bearing S.W. With winds from the southward large vessels should anchor off the east extreme of Watakano sima in 8 fathoms, with the north-east point of that island bearing N.W. by W. ½ W., and the south-extreme of the same island S.W. ½ W.

Small vessels will find shelter in either of the three following places; —off the town of Matoya, abreast the channel on the west side of Watakano sima, in 5½ fathoms; half a mile farther westward off Tori saki, in the same depth; or in the inlet of Ō ura, 1¼ cables S.W. by S. from the south point of Watakano sima, in 5 fathoms.

LIGHT.—On the eastern extreme of Anori saki, the southern entrance point of Matoya harbour, at an elevation of 102 feet above the sea, is exhibited a white light of the fourth order, which *revolves* every *half minute,* visible from seaward in clear weather from a distance of 15 miles, between the bearings of N.E. ¾ N. (through West) and

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* Commander P. G. Hicks, H.M.S. *Albatross,* 1883.

E. ½ S. The light tower, 41 feet high, is built of wood, octagonal in shape, and painted white.

Supplies are very limited ; a few fowls and eggs may be obtained, and also fish. The hills abound in game of various descriptions, especially pheasants ; and wild boar may often be purchased.

Tides.—It is high water, full and change, in Matoya harbour at 6h. 50m.; springs rise 6 feet; neaps rise 1¼ feet.

Directions.—On entering Matoya harbour the reefs on either side of the entrance are nearly all visible; steer so as to pass the outer rock above water, on the southern shore inside Anori saki, at a distance of 1½ to 2 cables, and then alter course to West for the opening leading to the town, seen south of the cliffs of Miya no saki ; this will lead 1¾ cables south of Haka sé, and well clear of the rocks off a point on the southern shore. When Anori saki lighthouse bears S.E. by E. steer N.W. ½ N. for the anchorage in 5¼ fathoms, in the northern portion of the harbour.

If intending to anchor on the east side of Watakano sima continue on the West course towards the town of Matoya until the south extreme of Watakano sima bears S.W. ½ W., when steer for it on that bearing, which will lead to the anchorage in 8 fathoms, S.E. by E. ½ E. of the north-east point of the same island. The above directions are intended for large vessels, those of less draught can anchor in either of the three places before described, remembering that if wishing to anchor off the south point of Watakano sima in a vessel drawing over 10 feet, it would be prudent not to attempt the channel on the east side of that island, but proceed round it to the northward.

YOROI SAKI, a projecting point N.N.E. 2$\frac{4}{10}$ miles from Sungi saki, the northern point of Matoya harbour, may be recognised by the small village on it, and isolated rocks extending from it; also by two conspicuous clumps on the shoulder of a range 364 feet high, about half a mile north and west from it. The coast between is foul and fringed with off-lying rocks.

Ishigaki iwa, a pinnacle rock, 20 feet high, surrounded by many small rocks and isolated dangers, lies 2$\frac{6}{10}$ miles north of Yoroi saki, and 7 cables from the shore; as there are other rocks situated 4 cables south of it, the passage between these dangers and the land should not be attempted, but if obliged to take it, the summit of Suga sima bearing N.N.W. ¾ W. will lead through in deep water.

TOBA.*—At 5 miles north of Matoya harbour, the coast trends suddenly to the north-west, (forming the western shore of the entrance to Owari bay) and is broken and rocky, being split up into many inlets, which, however, are mostly filled with rocks; the largest of these inlets is

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* *See* Admiralty plan :—Toba anchorage, on chart No. 952; scale *m* = 2 inches.

Toba bay. Off this coast and stretching across the entrance to Owari bay are numerous islands and clusters of rocks reaching nearly to Irako saki, distant 10 miles.

The town of Toba is built on the western entrance point of a narrow and shallow creek west of Toba bay, extending south upwards of half a mile, and at the head of which is the Kamo gawa. Fronting the town are the ruins of a castle, formerly the residence of a Daimio; off this castle is a small wooded islet (Ojima) and 3 cables farther east is the island of Sakate. Junks and small coasting steam vessels chiefly visit Toba bay when proceeding to and from the numerous large towns in Owari bay.

The mountains rising above Toba are high, Asama yama attaining a height of 1,875 feet. From the eastward the entrance can be easily recognised by them, as the land southward over cape Sima is low; the peak of Kami sima, an island in the centre of the eastern channel to Owari bay, is also very prominent when seen from seaward.

Sakate an island facing the town of Toba, is about half a mile long, 800 yards broad, and 349 feet high, having a navigable channel all round it; that to the south-eastward, between the mainland and Suga sima, is narrowed by rocks, awash at high water, lying 2 cables S.E. by E. from the south-east point of Sakate. Vessels can pass on either side of these rocks, midway between them and the shore.

Caution.—The soundings in the eastern approaches to Toba anchorage are irregular, and the lead gives little warning when nearing the numerous shoals and dangerous rocks that exist, and nearly all of which are steep-to; great caution is therefore necessary when navigating in this locality, especially in the narrow channels, where the tidal streams run occasionally with great velocity.

Tides.—It is high water, full and change, at Toba anchorage at 6h. 37m.; springs rise 6 feet; neaps one foot. The flood stream runs northward, and ebb southward.

Supplies.—Fish, rice, vegetables, and poultry can be easily obtained. Wood suitable for making small spars can also be procured at a moderate price. The hills abound with wild boar, deer, and pheasants.

Anchorage.—A village is situated on the southern side of Sakate, and anchorage may be obtained in 10 fathoms at a distance of 2 cables from it, in the centre of the channel, 1¼ cables from the shore; vessels may also anchor on the west side of Sakate, midway between it and the small wooded islet Ojima in front of the castle, in 12 fathoms. Neither of these anchorages are good, as the tidal streams run strongly through the channels.

SUGA SIMA, the highest island near Toba, is immediately east of Sakate; it is a little more than 2 miles long, and when seen from the southward, its summit (773 feet high), near the centre, shows flat; but when seen from the eastward it appears sharp. The east extreme is a projecting rocky point, having detached rocks, with dangers outside them, extending 2 cables from high-water mark; near this point, on the northern shore, is a small village 2 cables from which is a rocky patch with only 13 feet water on it.

LIGHT.—On the north-eastern extreme of Suga sima, at the entrance to Toba anchorage, from an elevation of 176 feet above the sea, is exhibited a *fixed* white light of the fourth order, visible in clear weather from a distance of 15 miles. The light is seen from seaward between the bearings of N. ½ E. and S.S.E. ¼ E. The tower (34 feet high), is built of brick, and painted white.

The COAST.—The coast south-west of Suga sima is indented with creeks, only suitable for boats, and there are two small islets, the outer of which (Oo-mura) is 164 feet high.

Shoal.—A rocky patch of 2 to 5 fathoms water lies nearly in the fairway for vessels passing through the channel to the southward and west of Suga sima; it is 1¾ cables long by one cable broad, and the shoalest part, 12 feet, is situated with the summit of Sakate in line with the west point of the channel bearing N.W. ¼ W., distant from the latter 4½ cables.

He sima, three small islets, near each other, lie close to the coast, three-quarters of a mile north of Toba castle; the centre islet, 57 feet high, is connected to the northern at low water, and there is a boat passage on either side of the southern islet.

Anchorage can be obtained between these islets and Sakate in 6½ fathoms, mud bottom, with the west point of Sakate in line with Single tree hill 476 feet high, over the east side of Toba creek, bearing S.S.E., and the southern extreme of He sima W. by N. ½ N.

The COAST.—There is a bay, 6 cables deep, south-west of He sima, only suitable for junks. Northward of He sima, and 6 cables distant, is an island, 600 yards long, having a narrow channel on the west side, and on the east side a navigable channel 4 cables wide, between it and Momotori sima, with a depth of 25 to 30 fathoms in the centre.

Nearly one mile west of this channel, and South of the west extreme of Toba sima, is a bay, 1¼ miles deep, and about half a mile wide, with a rock 10 feet high, in the centre. Anchorage may be obtained just within the entrance of this bay, but a depth of 3 fathoms is found at a distance of 2 cables from the western shore. The best position is in 6½ fathoms, with Hino yama (the centre of three bare peaks near each other, over Toba), just open of the east extreme of the rock in the centre of the bay, bearing

S. by E. ¾ E.; and the north-east point of the bay in line with the west point of Furusato bearing N.E., distant from the former 2¼ cables.

Between the north-west point of this bay, and the west extreme of Toba sima, a distance of 4½ cables, is a channel leading into Owari bay, in the centre of which is a depth of 28 fathoms.

Futami, two pinnacle rocks, about one mile westward of the above (west) entrance to Owari bay are situated near the shore, at the extremity of a long sandy beach, which curves round the western shore of that bay. A large river, Minato gawa, flows into Owari bay 2¼ miles west of these rocks.

Ye mura, a large village at the mouth of the Kagamiye gawa, (which is connected with the Minato gawa), is situated one-third of a mile east of Futami; it is resorted to by junks for protection from northerly winds, and a small pier has been built on the west side of the mouth of the river.

Soundings.—Shoal water extends off the Minato gawa, a depth of 2½ fathoms being found 1¾ miles eastward from it; and northward of Toba sima, for the same distance, are depths of only 4 to 5 fathoms. Between these two banks there is a deep channel, the portion of it at present surveyed extending a distance of 2½ miles north of Toba sima; for this distance from the west entrance into Owari bay, Hino yama, seen in line with the north-west point of the bay (just south of Toba sima and west point of the channel), bearing S.S.E. ½ E., leads through the deepest part.

MOMOTORI SIMA, the largest island at the entrance to Owari bay, lies north of Suga sima, separated by a channel 9 cables wide, having irregular depths at its east entrance, and deep water north of Sakate, and in the narrow channel on the west side of the island. Momotori sima is 3¼ miles long E.N.E. and W.S.W., and about one mile wide; its summit, 552 feet high, being over its west side, and a ridge of hills, about 400 feet high, extending its whole length. On the northern side of the island, about 1¼ miles from the west exteme, is a bay open to the northward, distinguished by having on the north-east point a remarkable boulder rock.

On the west side of the bay a chain of islets extends westward for a distance of 2¾ miles, having boat channels between them; the western islets (Toba sima) are all small and nearly connected at low water; the centre islet (Furusato) is 194 feet high and three-quarters of a mile long; the eastern islet (Ushi jima) is 6 cables long, and very narrow.

The south-east point of Momotori sima is a peninsula, 200 feet high, one quarter of a mile south of which is a narrow ledge parallel with the coast, the least water on it being 3 fathoms. An isolated rock, awash at low water, lies 6¾ cables east of the same point.

Off the north east-point of Momotori sima a chain of islets, rocks, and dangers extend to the north-eastward for 2½ miles, the principal of which are as follows:—

Odzu-kumi sima, half a mile from Momotori sima, is the highest island of the chain, being 268 feet above water. The southern shore of this island is surrounded with off-lying rocks; and between it and Momotori sima is a small island, 96 feet high, connected with the latter at low water; in the centre of the passage there is deep water, but the numerous dangers lying to the southward render it useless to vessels.

Kodzu-kumi sima, 4 cables east of Odzu-kumi sima, is 135 feet high, bare, and is the easternmost island off Momotori sima; it is only 300 yards long, and the channel between it and Odzu-kumi contains several small rocks.

Konsa sima and Shimodsusa sima, two pinnacle rocks, with less than 6 feet water over them, lie east of Kodzu-kumi sima; they are 6 cables apart N. ½ E. and S. ½ W. of each other, with deep water near and between them.

Konsa sima, the northern rock, lies with the high peak Asama yama in line with the summit of Kodzu-kumi sima, bearing S.W. by W. distant from the latter island 8½ cables; and Suga sima lighthouse bearing S.S.W. ¼ W.

Shimodsusa sima, the southern rock, lies E. by S. ⅛ S., 7 cables, from the summit of Kodzu-kumi sima, with Suga sima lighthouse bearing S.S.W. ¾ W., and Kami sima summit E. ¼ S.

Suga sima lighthouse bearing S.W. ½ S. leads 5 cables east of the southern rock, and one mile from the northern; the summit of Kami sima bearing E. by S. leads between the rocks and 2¾ cables north of Kodzu-kumi sima; and the same summit when bearing S.E. by E. ¾ E., leads 3 cables north of these rocks.

Anchorages.—A small vessel will find shelter from southerly winds in the bay on the north side, before mentioned, immediately inside the entrance, in 7¼ fathoms; with the north extreme of Furusato, in line with the north point of Ushi jima, bearing W. ¾ S., and Boulder rock, on the north-east point of the bay, bearing N.E. by N., distant nearly 2 cables.

Should a vessel require shelter from northerly winds, and not wish to proceed far to the westward, anchorage can be obtained on the southern side of Momotori sima, in about 7 fathoms, mud bottom, 3¾ cables from the shore, with the west extreme of Toba sima in line with the west extreme of Momotori sima, bearing W. by N. ⅓ N., and the west point of Suga sima bearing S. by W. A vessel may also anchor 9 cables farther eastward, in 5¾ fathoms, sandy bottom, with Single-tree hill in line with Tree rock (on west extreme of Suga sima), bearing S.W. by S., and the rocks off the eastern extreme of Suga sima, bearing S.E. by E. ½ E.

KAMI SIMA, about three-quarters of a mile long north and south, and half a mile broad, lies nearly in the centre of the eastern (main) entrance to Owari bay; it rises from its eastern side in precipitous cliffs to a height of 544 feet, a portion of the cliffs being white. The summit is very conspicuous from all directions.

The west, north, and north-east sides of Kami sima are foul, and should not be approached nearer than half a mile. A small village is situated on the beach on the north side.

Oki no sé, are two dangerous reefs to the south-west of Kami sima the eastern of which, nearly awash at low water, is 200 yards long and 100 yards broad. From it Kami sima summit bears N.E. ½ E. distant 1½ miles, and Kodzu-kumi summit N.W. by W.

The western reef, 1½ cables in extent, lies half a mile south-west of the eastern reef, and N.E. by E. ¼ E., 2¾ miles from Suga sima lighthouse. It consists o two small pinnacle rocks, 2 feet above high water on its west side, the east extreme of the reef covering at high water. The west pinnacle is always above water, and is steep-to, there being 5 fathoms only 50 yards from its west side.

Clearing marks.—The summit of Suga sima in line with the lighthouse bearing W.S.W. leads 3½ cables south of these reefs, and 4 cables south of Kami sima.

To pass north of these reefs, Irako saki in line with the north extreme of Kami sima is a close mark. Chopporo yama, the only sharp peak near Irako saki, in line with the north extreme of Kami sima, bearing N.E. by E., will lead 3⅓ cables from them.

The summit of Kodzu-kumi sima bearing N.W. ¾ N. leads 1¼ cables west; and when bearing N.W. by W. ¾ W. leads 2½ cables east of Oki no sé.

Soundings.—Between the eastern point of Suga sima and Oki no sé the depths are irregular; 4 cables south-west of the latter is a patch 3 cables in extent, having 5 fathoms least water; and one mile distant in the same direction is another shoal, of 8½ fathoms.

Off the eastern point of Suga sima there is a depth of 10 fathoms at a distance of half a mile from high-water mark; when passing this point keep Yoroi saki in line with Ishikagami, bearing S. ¼ W., which will lead 9 cables east of the lighthouse.

Tai sima, a shoal nearly one mile long, and 7 cables broad, lies 3¾ miles east-south-east of Suga sima lighthouse; the least water obtained on it was 5 fathoms, but as it breaks in very heavy weather, there is probably less, and it should be given a wide berth.

Six-fathom shoal.—Between Tai sima and Kami sima is a shoal nearly square, 7 cables in extent, the least water on which (6 fathoms) is on its eastern part; from it Suga sima lighthouse bears W. by S. distant 4¾ miles.

Directions for Toba anchorage.—Entering Toba bay from the southward; when abreast the entrance to Matoya harbour, steer to the north-eastward, keeping one mile from the shore until the summit of Kodzu-kumi sima (the easternmost island off Momotori sima) bears N. ¾ W., when steer towards it on that bearing, which will lead about one mile east of Ishikagami.

When the southern point of Suga sima bears W. by N. ½ N., alter course to W. by N. ¼ N. which will lead direct to the western point of the channel and in the deepest water south of Suga sima; continue on this course until Sakate summit is seen in the centre of the channel, bearing N.W. ¾ W., when steer towards it, and on nearing the rocks (awash at high water) situated 2 cables from Sakate, if proceeding into Owari bay, proceed midway between the rocks and the western shore of Suga sima; but if intending to anchor off Sakate, pass the point on the western side of the channel, about half a cable distant, and anchor as convenient on either the south or west side of Sakate, in the positions before recommended.

The tidal streams run through this channel with great velocity, the flood to the northward, ebb southward; great care is therefore necessary when passing the small rocks, awash at high water, as this is the narrowest part of the channel.

If intending to proceed east of Suga sima, steer as before towards Kodzu-kumi sima on a N. ¾ W. bearing, and when abreast Ishigaki iwa, haul to the westward, passing the east point of Suga sima, with Yoroi saki in line with Ishigaki iwa, bearing S. ¼ W. When the south extreme of Momotori sima bears W. ¼ S. keep it on that bearing, as this leads in the deepest part of the channel north of Suga sima lighthouse; when the lighthouse is lost sight of, alter course to W. by S. ½ S., which will lead to the anchorage between Sakate and He sima.

If bound to Toba from the eastward, south of Kami sima, keep Suga sima summit open one quarter of a point south of the lighthouse, bearing W. by S. ¾ S., and when Kodzu-kumi sima bears N. ½ W. alter course to the north-westward, until the south extreme of Momotori sima bears W. ¼ S.; when enter the channel on that course and proceed as before directed. If entering from the south-eastward remember the bearings of Suga-sima lighthouse to clear Tai sima.

When proceeding from Toba bay, through the channel west of Momotori sima into Owari bay, keep mid-channel between Toba sima and the southern shore, remembering that there is no channel for vessels between the islets eastward of Toba sima. When west of Toba sima steer to the north-westward with Hino yama in line with the north-west point of the bay south of Toba sima, bearing S.S.E. ½ E.; this mark leads in deep water as far as the portion at present (1881) examined.

IRAKO SAKI, the eastern point at the entrance to Owari bay, 2¼ miles north-east of Kami sima, is a rocky promontory, rising rather abruptly to a height of 172 feet, and having dangerous rocks extending off it to a distance of 1⅓ cables. A hill, 272 feet high, rises above the point, 7 cables eastward of which is the sharp peak of Chopporo yama, 484 feet high.

From the north side of Irako saki a shingle beach extends about N.N.E. for 5½ miles, and then trends to the eastward, fomirng the southern shore of Mikawa bay.

On the south side of Irako saki is a sandy beach about three-quarters of a mile long, terminated by a rocky point, off which are some detached rocks, the principal of which are Ashika jima and Anagura jima.

Vessels should not pass Irako saki within a distance of three-quarters of a mile.

Tide rips are frequently seen west of the cape, but no dangers have yet been discovered; both tidal streams run very strongly, the flood to the northward, ebb to the southward.

Irako saki anchorage.—Fair protection from winds between N.E. and South, with very good holding ground, may be found at about 3½ cables from the shore in 7 fathoms. H.M.S. *Sylvia* rode out a typhoon here in October 1877. Better anchorage however would be found further up Owari bay, in Mikawa bay, which although it has not been examined appears to have a remarkably even sandy bottom and to be well protected from a heavy sea.

Ashika jima, 20 feet high, is situated E. by S. ¾ S., 6¼ cables from Irako saki, and near its east side are two small rocks. To the south-west of the cape are several rocks both above and below water, terminating at 1¾ cables from Ashika jima, in three isolated rocks, 8 feet above high water.

A number of seals have been seen on Ashika jima.

Anagura jima, an islet 70 feet high and perforated, lies 4½ cables east of Ashika jima, close to a rocky point on the mainland. A small rock, 37 feet high, lies 1¼ cables west of it, and the same distance farther westward is a rock, awash at low water, half a cable from the coast.

There is a depth of 5¼ fathoms close south of Anagura jima; and vessels must not pass between Ashika jima and the coast.

The EAST CHANNEL into Owari bay, between Kami sima and Irako saki, is clear of danger, but the former island should not be ap·

proached nearer than half a mile; and Irako saki and the small rocks lying eastward of it, not nearer than three-quarters of a mile.

The southern passage, in which are many rocks, should not be attempted.

If entering Owari bay from the southward through the eastern channel; pass the lighthouse on Suga sima east point, with Ishigaki iwa in line with Yoroi saki, bearing S. ¼ W.; continue this course until the lighthouse bears S.W. ½ S., which bearing kept on, astern, leads between the rocks eastward of Kodzu-kumi sima and Kami sima. When the summit of the latter island bears S.E. by E., a course N.N.W. ¼ W. can be shaped for Yokaichi, on the western shore of Owari bay, distant 27½ miles, passing 2½ miles west of Noma saki, on the eastern shore.

Caution.—Should it be necessary to enter Owari bay at night, attention is called to the similarity in appearance which exists between Kami sima and Irako saki, with the hill immediately east of it. The latter being connected with other hills by very low land much resembles Kami sima, while the low land being undistinguishable may be mistaken for the entrance to Owari bay. The similarity is most marked when the island and cape bear W.N.W. and N.W. ½ W. respectively.

ISI SEA (OWARI BAY).*—This gulf, the main entrance to which lies between Kami sima and Irako saki, is about 35 miles long north and south, and is divided into three separate arms, that to the westward being the largest.

According to examinations made by the German vessel of war *Elizabeth*, and the Japanese, Owari bay has no greater depth than 22 fathoms, decreasing to 7 or 8 fathoms on the east, west, and south-west sides of the bay, at distances of one to 3 miles from the shore, and gradually shoaling towards its head, off which shoal water extends for about 5 miles. Large vessels without local knowledge should not shoal to less than 8 fathoms. Near the mouths of various small rivers mud banks have formed, on which the water shoals to 3 fathoms; in few cases can these banks be discovered by the discoloration of the water.

The western side of Owari bay shows a high mountain range, broken opposite Yakaichi. The eastern coast is low; from Moro saki to Taka me saki are hills of moderate elevation; north of Noma saki the land appears level and wooded. The *Thabor*, in 1875, proceeding in a nearly direct line from Kami sima (at the entrance) to Yakaichi on the west shore of the gulf, obtained soundings of 13 to 25 fathoms at 2½ or 3 miles from the east shore.

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* *See* chart Owari and Mikawa bays No. 952; scale, $m = 0{\cdot}5$ of an inch.

A shoal of 2½ fathoms, mud, lies about 2½ miles from the eastern shore, with Onia saki village (Tahara) bearing N.N.E., Noma saki S. by E., and Tokoname village E.N.E. (?) This shoal bank appears to join the shore.

Anchorage.—Vessels can anchor in any part of Owari bay, having due regard to the prevailing wind, for the bay is large enough to produce an inconvenient swell with a strong breeze.

Yakaichi is the port in Owari bay where all produce from the interior is shipped. Native steam vessels call regularly there, and the place is of rising importance.

Atsuda bay, the head of Owari bay, is shoal; Fune Kata (Atatsu) on its north-east shore, is the seaport of the city Nangoya, one of the largest and most opulent in the empire, possessing several large enamel manufactories. The *Thabor* anchored in 2½ fathoms about 5 miles from the village.

Mikawa bay, the western arm of the Isi sea (Owari bay), and the northern smaller inlet have only been partially examined. There appears to be no greater depth than 12 fathoms in either.

The COAST* from Irako saki trends to the eastward for about 60 miles as far as Omai saki at the western extreme of Suruga gulf, and is one long stretch of sandy beach on which are sand-hills and patches of trees, backed by low undulating land extending some distance inland to the foot of the hills. From 4 miles east of Irako saki to the entrance to Hamana Ko or Hamamatsu lagoon, a distance of nearly 25 miles, the coast is formed of remarkable yellow sandy cliffs which rise perpendicularly from the sea to heights varying from 100 to 280 feet, and is scored by numerous small ravines and water courses.

Hamana Ko (Hamamatsu lagoon), the entrance to which is nearly midway between Irako and Omai saki, is an extensive shallow sheet of water which only admits of junks at high water. Flat-bottomed ferry steam vessels, however, ply on it between the village of Shinjo on the western shore and the road to Hamamatsu on the opposite shore. At the entrance to the lagoon (on the eastern side) stands the large town of Mayesaka, a place of call for junks, but with no important trade.

Hamamatsu, a large town and telegraph station, from which the lagoon takes its name, is situated inland, some 8 miles eastward of Mayesaka.

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* Extensive patches of discoloured water, having the appearance of shoals, are frequently met with off this coast. They are merely caused by alluvium brought out to sea in suspension.—Commander Aldrich, 1880.

TEURIN GAWA, 12 miles eastward of the entrance to Hamamatsu lagoon is a river of some size, on the bar of which the sea breaks 3 cables off shore.

Kakesuka minato.—The sand and débris washed down by the Teurin gawa has formed a semicircular projecting sand-spit under the lee of which during westerly winds, good anchorage may be found in from 7 to 10 fathoms.

The COAST eastward in the immediate vicinity of Omai saki, is formed of high sandy beaches, which when approached from seaward stand out in marked contrast to the wooded patches which separate them, and to the wooded hills which rise to a moderate height behind them. Making Omai saki from the southward the lighthouse will be seen between the two eastern sand patches.

Winds.—During the winter months (October to March) on this coast westerly winds prevail accompanied by fine clear weather. As a rule the wind is fresher during the day, but sometimes it continues through the night with unabated force, varying in strength from 4 to 8, and lasting sometimes a week. During the continuance of these strong westerly winds the barometer rises gradually, attaining a level of 30·20 inches or higher. Immediately before the barometer falls a fine clear and comparatively calm day is sometimes experienced. A long heavy swell then sets in from the southward, causing a heavy surf on the beach, and the weather assumes a cloudy and threatening aspect. It is, however, seldom, if ever, followed by southerly winds at this season, except perhaps a moderate breeze lasting only for an hour or so. Rain, however, falls sometimes heavily and the wind shifts to the north-east, sometimes increasing to a strong breeze lasting for some few hours, when the barometer again commences to rise, the wind veers again to the westward, and blows more or less violently until the next fall of the barometer.

The strong westerly wind blowing across the heavy southerly swell causes a very heavy sea, as the latter continues to roll in, from 24 to 36 hours after the westerly wind has set in.

OMAI SAKI, the southernmost point of the province of Totomi, and the west point of entrance to Suruga gulf, is a dark wooded bluff 150 feet in height, terminating a nearly straight sandy shore, 63 miles in length, extending eastward from Irako saki to the entrance to Owari bay. The land in the vicinity of the cape is a plateau of sand. From the base of the hills the beach is from three to five hundred yards distant, and at low water shelving rocks which dry, extend fully 3½ cables from high water mark; landing here is therefore very dangerous when the rocks are covered. Omai saki may be recognised by two remarkable white patches, only one of which is visible from east or west.

Beacon.—A white wooden beacon surmounted by a ball is situated near the beach at about three-quarters of a mile north-west of the cape.

LIGHT.—Situated on a sand hill on the south-west part of the cape, is a lighthouse 71 feet high, painted white, from which, at an elevation of 173 feet above the sea, is exhibited between the bearings of E. by S. ½ S. (through east and north and west) and S.W. a *revolving white* light, attaining its greatest brilliancy *every half minute;* visible in clear weather, from a distance of 19 miles.

Lady Inglis rocks (Gozen iwa), a reef situated one mile east of Omai saki, is one-third of a mile long north and south, about a quarter of a mile broad, and is composed of isolated rocks, which uncover 4 feet at low water springs; * the sea does not always break on these rocks at high water, but its locality is marked by tide rips. From the northernmost rock the lighthouse on Omai saki bears W. ½ S. distant nearly 1¾ miles. Vessels can pass between the point and the Lady Inglis rocks, by keeping nearly one mile from the shore, but unless the Lady Inglis rocks are plainly visible this channel should not be used, as a small rock (awash at low water) lies between Omai saki and the Lady Inglis rocks, nearly half a mile off shore.

Anchorage.—Good shelter from westerly winds (between North and S.W.) may be found north of Omai saki. The best anchorage is in 6 fathoms water, with the cape bearing South, about 1¾ miles from a small white post which marks the landing place for boats. The holding ground is good.

At night the light should be brought to bear S.W., and steered for on that bearing until 12 fathoms are obtained, when haul up N.W. by W. and anchor in 6 fathoms.

North rock, just awash at high water spring tides, lies N. by W. ½ W., 5 miles from the Lady Inglis rocks, and about one mile off shore; this rock is steep-to all round.†

GULF of SURUGA‡ (Tutomi) the waters of which wash the western shore of the peninsula of Idsu, is 35 miles deep and 30 miles wide at entrance, between Omai saki on the west, and Iro-o saki on the east, and, with the exception of the Lady Inglis rocks and the North rock, is, according to present information, free from any impediment to navigation. There is no bottom at 250 fathoms in mid-entrance, no bottom at 160 fathoms midway across near the head of the gulf, and no bottom at 110 fathoms a little more than a mile from the western shore.

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* On no occasion during our stay off this coast were the Lady Inglis rocks visible above water. This is against previous experience, as they have been actually used as an observation spot.—Commander Aldrich, 1878.

† The British barque *Oleander*, Mr. W. Jones, master, was reported to have struck (in August 1880), on a rock lying 5 miles N.N.E. ½ E. (approx.) from Omai saki. This rock was searched for without success by Lieutenant R. Hoskyn, R.N., 1881, and is believed not to exist. North rock, and that on which the *Oleander* struck, are probably the same.

‡ *See* Admiralty chart:—Omai saki to gulf of Tokio (Yedo) including Suruga gulf No. 953; scale, $m = 0 \cdot 48$ of an inch.

The eastern side of the gulf is generally a belt of cliffs, broken, however, into several deep water havens, which, though small, afford good anchorage, but for sailing vessels with a foul wind are all difficult of access; in fact, even with a free wind outside, it constantly happens, from the numerous gulleys and valleys between the hills eddying the wind out of its course, that vessels are taken aback, and as the entrances of those harbours that are known, Tago, Arari, Heda, and Yeno ura bays are too narrow to admit of much manœuvring, it will be prudent not to hesitate to use the anchors should the vessel make a stern board.

The western side of the gulf is not so well known as the eastern. It appears less precipitous, but judging from the soundings obtained off Shimidsu, is equally steep-to. Two large rivers (the Oi gawa and Abe kawa) and several smaller streams flow into the gulf on this shore, and at its head is the mouth of the large rivers Fusi gawa and Ugoi gawa.

Shimidsu and Yeno ura are two excellent harbours, the former on the west, the latter on the east side at the head of the gulf. The latter is a much finer harbour than Shimidsu, but the water is inconveniently deep for anchoring.

The shore at the head of Suruga gulf is low and sandy, numerous villages extending along its whole length. At the eastern end of the sandy beach just north of Yeno ura is the town of Numadzu situated on the western bank of the Ugoi gawa, half a mile within its entrance.

Fusi yama.—At the head of the gulf also, from which it is only about 13 miles distant, is Fusi yama, the highest mountain in Japan (12,450 feet), and although its summit is so far inland, it appears in clear weather to rise nearly abruptly from the beach.

SHIMIDSU HARBOUR,* formed by a low flat tongue of land of considerable width, stretching out in a north-easterly direction from the north-western shore of the gulf, affords good shelter in 10 to 15 fathoms water, soft mud, with an inner anchorage at its head, available for small vessels, which, if required, could be beached for repairs. A small river flows into the head of the bay.

This tongue of low land is well covered by sugar plantations and villages. Its extreme north point, of sand and shingle, is steep-to, there being no bottom at 100 fathoms at a little more than a mile off shore, and vessels running for the harbour may safely skirt the beach, and rounding the point at two cables distant, anchor by the lead or as convenient. With a southerly wind there is ample space for working, the lead giving good warning, and from the flatness of the land the sudden shifts of wind, so very embarrassing to vessels endeavouring to enter either of the four bays on the eastern shore of the gulf, are not so frequently met with. The town is situated at the south end of the harbour, and appears to be one of some little importance. It is the centre of a large and productive sugar growing district; plantations of the cane are to be seen in every direction. On the west side of the harbour are the villages of Yejiri and Shimidsu.

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* *See* Admiralty Plan:—Shimidsu harbour, on chart No. 996; scale, $m = 0{\cdot}95$ inches.

Supplies.—Large spars, pine and fir (the latter having a very short grain), small rough spars, hard oak, sugar of a very fair quality, flour, fowls, fish, vegetables, and water can be obtained.

There is no coal in Shimidsu, but the charcoal, when attainable in sufficient quantities, is admirably adapted for steaming purposes, and was extensively used by the gun-boats attached to the *Actæon* in 1861. There were several qualities, the softer being little better than Japanese coal; but there is a very hard description (of a blueish black colour), which is better than any Welsh coal for high pressure engines.

Tides.—It is high water, full and change, at Shimidsu, at 7 h. 30 m.; springs rise 7 feet.

YENO URA* situated in the north-east part of Suruga gulf, is one mile long, north and south, and about three-quarters of a mile wide. Ara sima, a wooded island affording shelter from westerly winds, lies off the south point of entrance, and there is a small monument on the north point. The soundings in the bay are 20 to 30 fathoms, and it is open to the west, but there is good shelter from all winds in a small bay in its northern part, where the depth is 13 fathoms over a bottom of fine sand. In steering for this small bay, keep midway between its western shore and the cliffs on the eastern. A town stands on the western shore.

A small river flows into the bay, but as water is obtained with difficulty on account of its shallowness, it is best to procure it from the town wells. There is abundance of fish and vegetables. The rise and fall of tide is about 4 feet.

HEDA HARBOUR,* on the north-east shore of Suruga gulf, is 8 cables in extent N.W. and S.E., 4 to 9 cables wide, with depths of 8 to 22 fathoms over a bottom of fine sand; the entrance is open to the

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* *See* Admiralty plans:—Yeno ura and Heda harbour, scale, $m = 1\frac{3}{4}$ inches and Arariand Tago bays, scale, $m = 3 \cdot 0$ inches, on chart, No. 996.

N.W., and is to the northward of a low and sandy spit extending half a mile in a northerly direction from the southern shore. The harbour is sheltered on all sides by high mountains, and at its head there is a village in a valley. Six small rivers flow into Heda harbour, but it is preferable to obtain water from the wells. Fish and vegetables are abundant.

Tides.—The rise of tide is 5½ feet.

ARARI BAY,* sheltered also from all winds, lies 9 miles southward of Heda harbour. It is 4 cables long north and south, with an average width of 2 cables, but is only half a cable wide at the entrance between the shoal banks on either side, and it is therefore only suitable for small vessels; the depths are 6 to 12 fathoms over fine sand. The shores of the bay are mountainous.

Directions.—In entering keep in mid-channel, and when a small island (Benten sima) opens, steer between it and the sandy point to the S.W. After rounding this point steer South for the middle of the western bay, where the depth is 7 fathoms. The southern part of the bay is much narrower and the water is shoaler.

Supplies.—Water may be conveniently obtained from the village (Arari) on the eastern shore; fish is plentiful.

TAGO BAY,* about 2 miles south of Arari, is 4 cables in extent, north and south, and half a mile wide, but the entrance is narrowed to 2½ cables between Taka no sima (a group of islets off the south point), and Benten sima on the north shore. It is sheltered from all winds and has depths of 12 to 20 fathoms, soft mud bottom. There is a small town here, and water can be obtained from the wells. Fish and vegetables can be procured.

Directions.—In steering for the entrance, which is open to the N.W., two islands situated in nearly mid-entrance half a mile from Taka no sima will be seen, with rocks and breakers extending to the southward from them.

Pass northward of these islands, at not less than one cable from the northern, and between them and the mainland. After passing about a cable to the northward of Taka no sima off the south point of entrance, steer S.E. for the middle of the bay, where there is anchorage in 13 fathoms, off the village of Tago.

These four bays above described will serve as a refuge from S.W. winds, which cause a heavy swell in Suruga gulf. Their coasts are wooded and mountainous, attaining the height of 1,000 feet. The entrances may be approached fearlessly, for the high coast conceals them, and the bays only open when within a mile of the shore.

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* *See* Admiralty plans:—Yeno ura and Heda harbour, scale, *m* = 1¾ inches; and Arari and Tago bays, scale, *m* = 3·0 inches, on chart, No. 996.

The whole of the western coast of the Idsu peninsula is shelving, and may be safely approached to 2 miles ; islands lie off it, but not beyond the distance of a mile. The current is stronger along the shores than in the middle of the gulf.

IRO O SAKI (cape Idsu), the southern extremity of the mountainous peninsula of Idsu, is a bold, rocky, headland, and may be recognised by a conspicuous white cliff 3½ miles north-west of it, and a conical rocky peak a few miles farther in the same direction, forming the south-western extreme of the peninsula. The white cliff is very remarkable from the S.W. and South. There is an islet 50 feet high a quarter of a mile off the shore, one mile west of the cape. To the E.N.E., the coast for 3 miles is very broken and fronted with numerous sunken rocks.

LIGHT.—On the point, at an elevation of 185 feet above the sea, is exhibited a *fixed red* light of the fifth order, visible in clear weather between the bearings of E. by S. ¾ S. and W. ¾ S., from a distance of about 10 miles. The tower is 24 feet high, octagonal shaped, built of wood, and painted white.

MIKOMOTO (Rock island), about 104 feet high and one-third of a mile in length, with precipitous shores and and an uneven outline, bears E. by S. ¾ S. about 5 miles from cape Idsu ; it has a thick matting of grass, weeds, moss, &c., on its summit. Between this rock and the mainland are the Yokone and four other rocks, among which the junks freely pass ; but a vessel should not attempt to run inside Rock island at night unless her distance from it can be accurately estimated, for some of the rocks about Yokone are small ledges only 2 miles distant from Mikomoto. At 6½ cables N. ¼ W. from the lighthouse is a rocky patch of 4 fathoms.

The channel between Mikomoto and Yokone rocks carries irregular soundings of 14 to 30 fathoms, with the exception of a patch of 9 fathoms 3 cables north of the island. An additional reason for not using this channel at night is, that by crossing on a more southerly course towards cape Sagami the influence of the indraught on the eastern side of Sagami ura is not so likely to be felt.

LIGHT.—On Mikomoto, at an elevation of 164 feet above the sea, is exhibited a *fixed* white light of the first order, visible in clear weather at a distance of 19 miles. A *red* ray is shown from the lighthouse when bearing between S.E. ¼ E. and S. ¾ W., over all the dangers between Mikomoto and the shore; the eastern edge of the ray leading into Simoda harbour. The tower is 72 feet high, built of white stone.

Tides.—The tides are regular, the flood setting W.S.W., 1½ miles an hour, the ebb E.N.E., from 2 to 3 miles per hour; thus with the ebb tide the stream is considerably augmented in force by the general north-easterly current (Kuro Siwo) whilst the flood tide overruns the current close to the shore. To the north-west and north of Mikomoto there are overfalls caused by the tides passing over a very uneven bottom, but the Japanese fishermen deny the existence of any danger there.

Weather.—The vicinity of Rock island is remarkable for the exceptionally bad weather so frequently experienced in its neighbourhood. Sudden changes from strong south-west to as strong north-east winds and *vice versâ* occurring without any warning, aided by the strong current and tides here met with, tend also to raise a very heavy sea.

Yokone rocks, two in number, though they generally appear as one, bear N. by W., distant 2 miles from Mikomoto; the largest is about 25 feet high. Five other rocks (Masane, Ishitori, Tosu, and two smaller) occupy a triangular space of a mile from W.S.W. to N.N.W. of the Yokone, the northern and southern of these being small ledges nearly awash. A reef also extends 3½ cables towards them from Taraisi saki (Tohadgi point) to the north-west of the Yokone rocks. There is deep water between all these rocks.

SIMODA HARBOUR,* is on the eastern side of the peninsula of Idsu, 6 miles N.E. of the cape. To the northward of the harbour a high ridge intersects the peninsula; and south of this, all the way to the cape, it is broken by innumerable peaks of less elevation.

Susari or Vandalia bluff, the east point of entrance to the harbour, will be known by a grove of pine trees on the summit of the bluff, and the village of Susaki, which is about a third of the way between it and Tsumigi saki.

The entrance to the harbour between Susari saki and Noroshiga saki (Cove point) is 8½ cables wide, but only a short distance further in the entrance narrows to half a mile, between the shore northward of Susari and the island Aka no sima on the western shore.

The town of Simoda stands on the west shore of the harbour, and Kaki-saki village on the east. There is good landing for boats in Simoda creek, and also at the village.

Supplies.—Wood, water, fish, fowls, and eggs, also sweet potatoes and other vegetables, may be procured from the authorities at Simoda. It will be necessary to supply them with casks if water is required to be brought off.

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* *See* Admiralty Plan:—Simoda harbour, No. 2,655; scale, $m = 3{\cdot}8$ inches.

Oki Hibari sima (Centre island), lying nearly in the middle of Simoda harbour, bears N. ¾ E. 5½ miles from Rock island, and N. by E. ½ E. 3½ miles from the Yokone rocks. It is high, conical, covered with trees, and a cave passes entirely through it.

Hibari sima or Buisaco islet, a quarter of a mile N.N.E. from Centre island, is about 40 feet high, and covered with trees and shrubs.

Oonagare (Southampton) and Supply rocks.—There are two hidden dangers in Simoda harbour; Southampton rock, lying in mid-channel, S. by E. ¾ E. 2 cables from south point of Centre island, and N. ½ W. from Vandalia bluff, about three-fourths of the way between it and Centre, is about 25 feet in diameter, and has 2 fathoms water on it, and was formerly marked by a white spar buoy. The other danger Supply rock, lying S. by W. a short distance from Buisaco is a sharp rock, with 11 feet water on it, and was marked by a red spar buoy.

Should the buoy on the Southampton rock be removed, the east end of Centre island in line with the west end of Buisaco islet will lead to the westward of this danger.

Anchorage.—In the outer road, or mouth of the harbour, a disagreeable swell is sometimes experienced; but within Southampton rock and Centre island vessels are well sheltered, and the water is comparatively smooth. Moor with open hawse to the south-west.

When this harbour was surveyed in 1853-54, the bottom throughout was mud; but a few months subsequently the harbour was scoured out to its granite foundations by the back sweep of three huge waves which in succession rose over the tops of the highest trees and left the bay nearly empty. Large junks were thrown some distance inland, and the Russian frigate *Diana,* left all but a total wreck. A great number of Japanese craft were swept away by the retiring masses of water, and their crews perished. Since then the harbour has been rather shunned as an anchorage, but the holding ground is good.*

Tides.—It is high water, full and change, in Simoda harbour at 5h. 0m.; springs rise 6 feet; mean rise, 3 feet.

Directions.—If intending to anchor at Simoda, pass Mikomoto at a mile, when the harbour will be in full view to the northward. Standing in from this island, a vessel will probably pass through a number of tide rips, but no soundings will be obtained with the hand lead until near the entrance, when the depth will be 14 to 27 fathoms. Should the wind be from the northward and fresh, a sailing vessel should anchor at the mouth of the harbour until it lulls or shifts, or until she can conveniently warp in, as the wind is usually flawy and always baffling.

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* H.M.S. *Sylvia* rode out a heavy southerly gale here, and Captain St. John, R.N. reports the holding ground to be excellent.

Approaching from the north-east or eastward, a vessel can pass on either side of Vries island, from the north and south points of which, Sumegi saki, bears respectively W.S.W. and West, distant about 21 miles. Between Vries and Simoda, no dangers are known to exist; but the currents are uncertain, and strong near the coast.

Should Vries be obscured by thick weather, before reaching Sumegi saki, endeavour to sight Mikomoto, for there are no conspicuous objects on the mainland by which a stranger could recognise the harbour at a distance, and the shore appears as one unbroken line. To the westward of the harbour there are several sand beaches, and three or four sand banks; these can be plainly discerned when within 6 or 8 miles, and are good landmarks. Off the village of Su saki, at a third of a mile from the shore, is a ledge of rocks upon which the surf is always breaking; give them a berth of 2 cables in passing.

Approaching Simoda from the south-east, pass westward of Kosu sima, from which the harbour bears N. by W. ½ W. distant about 27 miles.

Tsumigi saki, situated 1½ miles eastward of Susari, has immediately off it a rocky islet, northward of which is the bay of Soto ura, having in it several sand beaches, which may cause it to be mistaken for Simoda harbour; but on approaching Soto ura, Tsumigi saki will shut in cape Idsu, the Yokone rocks, and Mikomoto island to the southward; whilst in Simoda road they are visible from all points.

SAGAMI URA.—From Iro-o saki the coast rounds in a north-east direction 26 miles to Futo saki, its general features being high, rocky, and even, having near Simoda a few sandy beaches. Between Simoda and Futo saki the coast is bold of approach. Over it, the mountain Amagi yama rises to 4,700 feet, and on the north-east ridge is a conspicuous dome-shaped hill.

From Futo saki the coast trends more to the northward, forming a slight bend to Fuku ura, where it becomes more broken, but maintains its bold features under a lower range, the two highest points of which are elevated 2,970 and 2,460 feet; under the latter is a round hill with a large quarry facing the gulf. From these hills the long low promontory of Manadzuru, bordered by vertical cliffs, stretches to the eastward, and off its extreme point is a rock 20 feet high. On its west side is the open bay of Fuku ura. From thence the coast assumes a lower elevation, and gradually bending round to the eastward forms the treacherous bay of Odawara. To the northward of Futo saki are some small islands near the shore, Hatsu sima (120 feet high) being about 3 miles off shore. The north shore of Odawara bay is low to the east of the wooded bluff (Korai yama)

12 miles north-east of Manadzuru, and is said to be very shallow in front of the sandy beach.*

Sagami ura, from the lowness of the land at its head, has sometimes been mistaken for the Uraga channel. When past Vries island, however, the channel will be recognised by Su saki, its east point of entrance, being comparatively high (645 feet), whereas cape Sagami, the southern point of the peninsula of that name on the west side of entrance, is not more than 70 feet high, with the exception of a small hill of 354 feet elevation on the centre of its south part, named Tree Saddle, from two conspicuous clumps of large trees on its summit.

From Odawara the coast trends to the eastward for nearly 20 miles as far as Yeno sima, and then takes a southerly direction for about 12 miles to Joka sima.

Caution.—Care must be observed when steering for the Uraga channel not to be drawn into Sagami ura, as a considerable indraught has always been experienced, and the low land at the head of the bay contrasted with the high land to the westward of it, looks so distant, that the bay has often been mistaken for the channel, and the error only discovered when deeply embayed and probably close to some of the reefs which skirt the head and east side of the bay, the most dangerous of which is the Macedonian reef.

Hatsu sima, about three-quarters of a mile in extent, and 120 feet high, with a small village on its north-west point lies 3¼ miles off shore at 9 miles N. by E. ¼ E. from Futo saki. There is a safe channel between the island and the shore.

Ajiro harbour, about 1¼ miles wide at the entrance, and about the same depth, open to north-east winds, lies W.N.W. of Hatsu sima, about 11 miles north of Futo saki. The village of Ajiro is situated in the south east corner of the bay just inside and on the south point, off which anchorage may be obtained.

ATAMI ANCHORAGE, 2½ miles north of Ajiro, may be distinguished by a small white cliff to the northward; the bay is small and the water is deep, there being no bottom at 20 fathoms at the entrance. A natural breakwater forms a shelter for small vessels within it, there are depths of 13 to 5 fathoms.†

Anchorage may be obtained in 7 fathoms, black sand, with Hatsu sima bearing S.E. ½ E.; rock off the south point, S. by E. ⅓ E., and a conspicuous white cottage, W. ⅓ S. The anchorage is open to all winds from South, round by East., to N.N.E. The deepest water was obtained towards the south bluff, increasing from the anchorage to 9 fathoms, and towards the village and the north point it shoaled gradually to 5 fathoms within a short distance of the shore.

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* The head of the bay (Sagami ura) has not yet been closely examined.

† Navigating Lieutenant F. K. Taylor, H.M.S. *Salamis.*

Fuku ura, an open bay on the south side of Manadzuru saki (a promontory 1½ miles long) affords no shelter with winds between South and East.

Manadzuru anchorage.—With southerly winds shelter may be obtained on the north side of the promontory, but the water is deep.

YENO SIMA, 220 feet high, is the eastern extreme of the low shore fronting the plain at the head of Sagami ura, which is said to be very shallow, although there are 117 fathoms at 3 miles distance. Yeno sima has bold high cliffs of a light colour which makes it very conspicuous, and a flattish summit with a few large trees. On the south-east it cannot be approached within three-quarters of a mile, as an extensive reef skirts that part of the island. The island is connected with the main (where the Sagami hills terminate) by a narrow ridge of shingle which covers at high water, to the westward of which a small river disembogues. There is generally a heavy ground swell in this part of the bay.

Uba sima.—A large reef marked by a peaked rock 30 feet high, lies one mile off the beach, 2 miles to the west of Yeno sima. Three-quarters of a mile north-west from Uba sima is a similar reef (Hira sima), one mile westward of which is the mouth of the Baniu gawa, a large river.

The white pointed cliffs of Kotzbo mura will be seen 2¼ miles east of Yeno sima (the coast between being skirted by sunken reefs), and are a guide to the only anchorage on the north side of Sagami ura.

HORI-NO-UTSI MURA.—The bay directly east of the white cliffs is full of reefs and cannot be approached, but Hori-no-utsi mura, the bay next south-east, and to the north of Impérieuse bluff, is a fair temporary anchorage, though exposed to West and S.W. winds.

A reef 3 cables long extends from a low point at the foot of Impérieuse bluff. To the north-west of this, a chain of rocks project out westward from the low point just north of the bluff; the centre part of these is marked by a large white topped rock 20 feet high; the outer rock is very small but uncovered. At 3 or 4 cables north of this chain there is anchorage in 4 to 8 fathoms. The *Dove* and *Leven* anchored here, the line of rocks quite breaking the heavy swell from the south.

Macedonian reef lies off the east side of Sagami ura, at 4 miles N.N.W. of the lighthouse on the west end of Joka sima. It dries in many places at low tide, and, except in the smoothest water, always betrays itself by a breaker when covered, and is therefore easily avoided in daytime; but if it be not visible do not bring the lighthouse to the southward of S.S.E. ½ E. until the south end of the first range of hills, 700 feet high, north of cape Sagami, bears E. ½ N. The ranges of Sagami peninsula terminate in Impérieuse bluff, 500 feet high, wooded and very conspicuous. By keeping the west slope of the bluff bearing N. by E. a vessel will pass three-quarters of a mile outside the reef, in 30 fathoms.

ASINA BAY.—Vessels embarrassed in the vicinity of the Macedonian reef may find an anchorage about 1½ miles north-east of it in Asina bay, in 4 to 8 fathoms good holding ground, and sheltered from all points except westward, in which direction the sea has a clear fetch of 20 miles; but only a case of extreme emergency would justify a stranger in using it.

Entering the bay, when the south end of the above range of hills, 700 feet high, bears E. ½ N., or is in line with the south low projecting point of the bay, the Macedonian reef will have been cleared, and an E. by N. ½ N. course may be steered for the entrance, taking care to avoid a mass of rocky ground extending from the reef to the south extreme of the bay. There are also some rocks off the north side of the bay, but they show, and are easily avoided by keeping mid-channel.

KO-AJIRO BAY.—There are two or three excellent havens for small craft and junks on the west shore of Sagami peninsula, to the southward of Macedonian reef. Ko-Ajiro, the largest of these, is 2 miles north of Joka sima lighthouse, or three-quarters of a mile north-east of the Moroisi, a long reef of rocks, which extends off the point, N. by W. ½ W. of the lighthouse. There is no difficulty in entering. There is a reef off the north point of entrance which, with only one fathom water on it, stretches half across the entrance with a 4-fathoms channel on the bold south shore. Farther in a perch marks the end of the shoal from the south shore. Inside this is secure anchorage for a small vessel in 3 fathoms.

JOKA (JOGA) SIMA lies off the S.W. point of cape Sagami, with a channel about 2 cables wide, and encumbered with rocks, between it and the shore. The island is one mile long N.W. and S.E., and about 2 cables in breadth; it is skirted with reefs extending 1½ cables from the shore, and off its southern shore is a rocky patch of 2 fathoms, 2 cables from the island.

LIGHT.—On the west end of the island (Nagatsuru saki), elevated 106 feet above the sea, is exhibited a *fixed* green light of the fifth order, visible from seaward between N.W. ¾ W. (through East) and W. by S., and is visible in clear weather from a distance of about 9 miles. The tower is of brick, painted white, 25 feet in height.

Directions (S.E. COAST).—In navigating the south-eastern coast of Japan, after passing Sata no misaki, in Van Diemen strait, if the weather be thick, the vessel's position should be well ascertained before she is hauled to the E.N.E., as her course is parallel to the high land for about 20 miles from the pitch of the cape. It should also be borne in mind that the current on this coast (Kuro siwo) runs to the E.N.E. at the rate of from 40 to 100 miles a day (see page 37).

Vessels therefore bound to the eastward must allow for this current, and should not keep more than 30 miles off shore, taking every opportunity of verifying their reckoning;* if working up inshore the north-easterly set will be lost, and the ship will be influenced by the tides. Many vessels have under these circumstances reported the current as setting in various directions in the vicinity of the Kii and Boungo channels, indraughts, and vice versâ, resulting from the ebb or flood tide, being experienced at the time. In the summer season the north-easterly current is not to be expected in the vicinity of Iro-o saki (cape Idsu).

Vessels from the gulf of Yedo bound for the Kii channel, after passing Mikomoto (Rock island), should take an inshore passage, steering for Omai saki, and thence for Ō sima, thus avoiding the strength of the Japan stream. Following this course, a vessel may carry a favourable current (on the flood), and it has been often observed that there is a back set to the S.W. in the bights between Mikomoto (Rock island) and Ō sima. In following this route, take care to avoid the rocks off cape Sima. (*See* page 279.)

In approaching the gulf of Yedo, the remarkable high mountain Fusi yama (page 294), a lofty and symmetrical truncated cone of 12,450 feet elevation, and so different in form from any other land in its vicinity, cannot fail to be of great service in directing vessels either to Simoda, or the gulf of Tokio (Yedo.) In clear weather it is the first distant land seen, and generally to the north-eastward, visible at times upwards of 100 miles. Iro-o saki (cape Idsu) is in line with it when bearing North. When bound from the southward and westward endeavour to make Iro-o saki, or, better still if the landfall be made at night, Omai saki, the *revolving* white light on which is visible 19 miles. By day making the former cape (on which there is a *red* light visible about 10 miles), if the weather is at all clear, the chain of islands off the gulf of Yedo will at the same time be plainly visible. Omai saki, the west point of entrance to Suruga gulf, cannot be mistaken for Iro-o saki, the former being low, with a sandy beach and low sand hills, with occasional patches of trees (the coast preserving this character for 30 or 40 miles to the westward); whereas Iro-o saki is high and rocky, the lighthouse being situated at its foot, its summit being generally hidden in the clouds. Mikomoto (Rock island) is low, and unless the weather is clear, or at night when the light is visible, will not be seen until long after this cape and Vries island are made.

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* It is recommended to make the lights at Oö sima (entrance to the Kii channel) whenever it is practicable.

Between the Kii channel and Mikomoto, westerly winds are most frequently met with, falling light, when the latter place is passed; and often on rounding cape Sagami a strong N.E. wind is encountered.

The GULF of TOKIO or YEDO,* the entrance to which, named the Uraga channel, between cape Sagami on the west, and Su-no saki (in the province of Awa) on the east, is 10 miles wide. The gulf is 40 miles deep, and situated on the north-west shore at its head is the city of Tokio (eastern capital) formerly called Yedo, the commercial as well as political capital of the empire, and on the western shore, about 26 miles from the entrance, is Yokohama the principal seaport and treaty port of Japan.

The URAGA CHANNEL is remarkably clear of hidden danger. On its west side, about one mile from the shore, lies Ashika sima (Plymouth rocks), which are always uncovered and easily seen; close to them is a sunken rock (Kata sima). In their vicinity, off Senda saki and Uraga, are several rocky patches extending some distance from the shore. The mariner should bear this in mind, and as Kaneda bay has also some foul ground in it at nearly a mile from the shore, it would be prudent to give this locality a good berth in passing. At night a *red* ray is thrown over Ashika sima from both Sagami and Kuwan-on saki lighthouses. By day do not, when entering, bring Sagami lighthouse to bear southward of S.W. ¼ W. until Senda saki bears West, when steer to pass Kuwan-on saki at about half a mile.

SAGAMI MISAKI,† the western cape at the entrance to the Uraga channel, is comparatively low, the hills forming in a table flat about 150 feet in height, and rising, about one mile from the shore, to a saddle peak (Tree Saddle), having on it two conspicuous clumps of trees elevated 350 feet above the sea. The shore is clear at less than half a mile, except off the eastern part of the cape, where there is a patch of 4¾ fathoms at that distance lying S.E., 7 cables from the north extreme of the cape.

LIGHT.—On Tsurugi saki, the south-eastern point of cape Sagami, stands a white light tower, 36 feet high, from which, at an elevation of

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* *See* Admiralty chart:—Gulf of Tokio or Yedo, No. 2,657; scale, $m = 0 \cdot 75$ inches.

† The directions from Sagami misaki to Yokosuka are from the remarks of Navigating Lieutenant W. F. Maxwell, H.M.S. *Sylvia,* 1869.

110 feet above the sea, is exhibited a *flashing* white light of the second order, showing *a flash every ten seconds*, seen seaward between E. by N. (through North and West) to S.W. ¼ W., and visible in clear weather from a distance of 16 miles. A *red* sector of 16° covers the Ashika sima (Plymouth rocks) between S.W. ¼ W. and S.S.W. ¾ W.

KANEDA BAY, formed between Sagami misaki and Senda saki, is 4 miles wide and 2 miles deep, affording excellent anchorage with winds from South, round by west and north to N.E., in 10 to 3 fathoms, as convenient; sandy bottom, good holding ground. A range of hills slopes down to its north-west shore, the highest, Take yama, being 714 feet above the sea.

Oki-no sima, 3 feet above high water, is a black rock in the south-west portion of the bay, steep-to on the north side, but having foul ground between it and the shore on the south and west sides.

Mits iso, a cluster of rocks in the northern part of the bay, three-quarters of a mile from the shore, cover at high water. A shoal, having 6 feet on it at low water, lies W. by S. ¼ S. 7 cables from the southern and highest of these rocks, and another shoal of 9 feet lies W. by S. ¾ S., nearly one mile from the same rock.

Caution.—The above dangers necessitate great caution being observed when anchoring in this bay.

ASHIKA SIMA (Plymouth rocks) are two dark rocks 5 feet above high water, lying N.E. ½ N., 5½ miles from Sagami misaki, and S. by W. ¼ W., 3¾ miles from the lighthouse on Kuwan-on saki.

Kata sima, a rock awash, lies S.E. by E. ¾ E. nearly one cable from the eastern of the two rocks, and was, until lately, marked by a *red* beacon surmounted by a ball, about 20 feet above high water.

Clearing marks.—Kuwan-on saki bearing North leads half a mile eastward of the Ashika simas; and Sagami misaki lighthouse bearing S.W. ¼ W. leads three-quarters of a mile south-east of them. At night when entering the gulf of Yedo, keep Kuwan-on saki *white* light in sight bearing a little westward of North. Leaving the gulf, keep Kuwan-on saki light on same bearing astern until the *red* ray from cape Sagami lighthouse is crossed.

SENDA SAKI shows in steep white cliffs the termination of the range from Take yama. It has a dismantled fort at the summit of the cliffs, and is surrounded by detached rocks. The eastern portion of these rocks projects out in a spit, the outer edge, of 21 feet, lying E. by S. ¼ S., 6 cables from the point, leaving only a passage of 3 cables between it and Ashika sima. The outer detached rock awash, steep-to, on the south side, lies S.S.W. 9¼ cables from Senda saki.

On entering Kaneda bay from the northward, Ashika sima should not be brought to bear eastward of N.E. ½ N., until Take yama bears N.W. by W., to avoid the above dangers off the cape.

KURIHAMA, the bay north of Senda saki, has a sandy beach at its head, the end of a long plain which is drained by a river running into a lagoon that enters the sea at the north end of the beach. This bay should not be used as an anchorage, the ground being foul in all directions.

KADSUSA SAKI, the north point of this bay, is terminated by a conical mound, Shendōra, 69 feet above high water, from which a ledge of rocks extends S.E. ½ S. 4¼ cables to the outer depth of 5 fathoms. From this to Tomio saki the ground is foul nearly 4 cables from the shore.

URAGA, a thriving village, and clearance port of the junk trade to Tokio (Yedo) has a good harbour for vessels drawing less than 9 feet.

Tomio saki, the south point of the entrance to Uraga, is a low point, with a Japanese lighthouse and a memorial stone near its extreme, which when in line lead clear of Ka yama, a dangerous rock on the north side of the entrance.

A shoal of 12 feet lies E. ¼ S. 3 cables from the light, and there is less than 3 fathoms, three-quarters of a cable S.E. from it.

Miojin saki, the north point of entrance to Uraga, is a bold bluff surmounted by a battery. From it to Kuwan-on saki the land is undulating, with villages in sandy bays. The whole of this coast is foul for half a mile from the shore, having depths of 1¾ to 4¾ fathoms on the outer margin.

Ka yama with 12 feet on it at low water, and 4 fathoms, 2 cables to the eastward and southward, lies S. by W. ¾ W., nearly one mile from Kuwan-on saki lighthouse. Ashika sima kept bearing S.S.W. ½ W. until Kuwan-on saki light bears N.N.W. will clear all the foul ground on the northern shore of the entrance to Uraga.

KUWAN-ON SAKI, or Kānon saki, is a steep and partially wooded, prominent headland, over which, at one cable inland, is a conical hill 272 feet above high water.

LIGHT.—Situated on the slope of the hill above mentioned, is a white, square light-tower, on the centre of the keeper's dwelling, from which a an elevation of 178 feet above high water, is exhibited a *fixed* white light of the third order, visible in clear weather from a distance of 14 miles. A *red* ray is also shown from the same lantern over an arc of 11°, covering the Ashika sima (Plymouth rocks) between the bearings of North (nearly) and N. by E. ¼ E.

Also from a window, 32 feet below the principal light, is exhibited a fixed *red* light of the sixth order, showing over an arc of 26°, or between the bearings of S. ½ E. and S.S.W., in the direction of the Saratoga spit, and should be visible in clear weather from a distance of about 7 miles.

Reef.—The point immediately east of the lighthouse is steep to, but the south-east extreme of Kuwan-on saki has a reef off it, terminated by a rock awash, steep-to, 1¼ cables from the shore. From this to Rubicon point the coast is slightly indented, having sandy bays between the points. From Rubicon point rocks extend one cable, with deep water close to the outer.

Ō-TSU-NO URA is a deep bay with a sandy beach, having numerous villages, from the largest of which it takes its name. This bay has shallow water in the eastern portion, the outer shoal of 12 feet lying N.W. by W. ½ W. 8¾ cables from Rubicon point. In the centre of the bay is a shoal 4¼ cables long and 3 cables broad, having 9 feet on the north and 13 feet on the south edge, with uneven depths of 2¼ to 4¼ fathoms between. The north edge lies S. ¾ E. 4 cables from the south end of Saru sima, and N.W. by W. ¾ W., nearly 2 miles from Rubicon point.

SARU SIMA (Perry island), 198 feet high, is cliffy, with a wooded flat summit. The south-east point has a conspicuous single tree on it; and from the south extreme a sandy spit extends half a cable. This island has shoal water all round it, except off the north end.

Kitsne no se, E. by S. ¾ S., 3¾ cables from the south point, lies a rock that covers at high water, and West, 3 cables from the same, lie three rocks awash at high water. Between these and Kitsne no se, there is shallow water. No vessel should attempt to pass between Hana rete and Saru sima.

Hana-rete, 94 feet high, is a grass-covered conical mound, sloping down to dark rugged rocks. Between it and the western end of Ō-tsu-no ura the coast is composed of a series of white cliffs, with shingly beaches intervening.

Ko-naga ura.—Immediately south of Hana-rete is a deep bay, off the south point of which there is a conical islet 78 feet high, from which, S.S.E. ½ E., 3½ cables, lies a rock that dries at low water, with foul ground between it and the shore.

A rock, awash at low water, having on it an iron beacon surmounted by a cage, and painted red, lies N.E. by E., 3½ cables from Katshiriki point; East, one mile nearly from Ha sima at the entrance to Yokosuka; and N.W. 4 miles from Kuwan-on saki extreme. It may be approached to within a quarter of a mile on the north side, but vessels should not attempt to pass inside it.

YOKOSKA (YOKOSUKA) HARBOUR,* over one mile in depth, with a general breadth of 3½ cables, is the eastern of two large inlets, and may be easily recognized by Ha sima, 144 feet high, off its north-east point, and by a remarkable clump of trees, 355 feet above the sea, known as Azuma, on the highest hill of the promontory that separates it from F'ka ura, the western bay.

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* *See* Admiralty plan :—Yokoska harbour, No. 997, scale *m* = 7 inches.

The shores of the harbour are composed of a series of cliffs and indentations, the points generally being marked by white stone beacons. At the head of the harbour, which is the principal naval dockyard and arsenal in Japan, are two docks, with large smith and boiler factories, and all the necessary works for thoroughly repairing and building ships, the houses for the officials, being situated on a plain that joins Ō-tsu-no ura. On one of these factories is a clock tower, that may be seen from that bay. The inner part of the harbour is formed by two breakwaters, and is of considerable width at the entrance.

Docks.—South dock is 377 feet long, 72 feet broad, and has a depth of 22 feet 9 inches water on the sill at spring tides. North dock is 288¾ feet long 65¾ feet broad, and has 17 feet water on the sill. From the outer anchorage the turn into the docks is rather abrupt. A new dock is being excavated of considerable length, capable of taking vessels drawing 25 feet, and will be completed during 1884.

There are also two building slips, capable of taking vessels of about 800 tons.

Buoys.—A red beacon buoy marks the northern edge of a patch with only 9 feet water on, lying midway between Katshiriki point and Ha sima and 3¼ cables from the shore, on the east side of entrance to the harbour. Off the eastern points of Yokoska there are spits, having 10 to 12 feet on their outer edges; those off Eyi yama point extending N.N.E. 2½ cables, and N.W. ½ W. 1½ cables. The outer end of the latter is marked by a small red cask buoy, and a breakwater* is being built from the point in the direction of the buoy. Vessels should not bring Ha sima to bear northward of N.E. by N.

Anchorage may be obtained in 6 to 8 fathoms in any part of the bay, but large vessels should not go inside the outer red buoy, as there the anchorage space is only two cables broad.

Across the promontory that separates Yokoska from F'ka ura, a canal has been cut; boats may pass through when the tide has risen one foot above low water. Ako saki, the north-west extreme of this promontory, has rocks that show at low water, and shoals off it for 1½ cables.

Tides.—It is high water, full and change, in Yokoska harbour at 5h. 15m.; springs rise 8 feet, neaps 4 feet.

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* Will be 600 feet in length when completed, and will protect the harbour from the heavy swell which sets in during northerly gales.

F'KA URA, an inlet 8 cables long, and 4 to 2 cables wide at the entrance, opening out to over 6 cables wide at its head, affords good anchorage in 7 to 4½ fathoms, mud bottom, as convenient; the water shoaling gradually as the bay is entered. There is no danger in mid-channel, but the head of the bay shoals rapidly at 1½ cables from the shore.

Yenokido is a deep inlet on the western shore of this bay, with too narrow an entrance for ships, but a good harbour for junks, extending inland 4 cables, and having a general width of one cable; the village of Eto is situated on the west side of this inlet. From its north point, E. by N. ¾ N., 1¼ cables, lies Yabama, a reef that just shows at high water, steep-to on the outer edge.

NATSU SIMA is a partially wooded island 184 feet high, lying between F'ka ura and the entrance to Kanasawa inlet. It has a spit of shoal water with 4 fathoms on its outer edge, extending East 7 cables, and shoaling gradually towards the shore.

Yeboshi yama is a conical rocky islet, joined to the shore near Yenokido at low water, and separated by a channel, one cable wide, from the south-west point of Natsu sima.

The COAST.—On passing Natsu sima a creek is seen, which on entering, winds round in a northerly direction, and at about half a mile from the entrance the channel contracts, passing which it opens into a large shallow lagoon. A narrow channel marked by stakes and bushes leads up to the village of Kanasawa, situated in the north-east corner. From this village there is a good road (which lies through a remarkable narrow pass) to the town of Kamakura, celebrated in the history of Japan as being a former opulent town, and also at this time for its ancient temples. Continuing this road for some distance about 2 or 3 miles from Kamakura is the celebrated bronze statue of Daibutsŭ sama, situated in a beautiful grove at the foot of a valley.

From Natsu sima the coast takes a northerly direction for 3 miles to Graham bluff, is shallow for some distance, and at 2 miles off shore is skirted by banks of 4½ to 5 fathoms, with deep water between them and the coast.

MISSISSIPPI BAY (Nigisi) formed between Graham bluff to the southward and Treaty point on the north (between which it is 3 miles in width), is well sheltered from the prevailing winds. In anchoring give the shore a wide berth to avoid a shoal which extends half to three-quarters of a mile from it. Between Natsu sima and Treaty point the soundings are irregular, shoaling suddenly from 12 to 5 fathoms on banks of hard sand. A patch of 1¾ fathoms lies one mile N.E. by E. from Graham bluff.

HOMUKU or TREATY POINT, the termination of a ridge of low hills extending into the gulf of Yedo, about 10½ miles N.N.W. of Kuwan-on saki, forms the southern point of the bay of Yokohama. The point is formed of a long line of cliffs of a conspicuous yellow colour, the northern bluff of which is named Mandarin bluff.

These bluffs, and a bank which fronts them to the distance of 1¼ miles in some places, and which is rather steep-to, protects the anchorage off Yokohama from south-easterly winds, which blow with sufficient force to send a heavy sea into the bay.

LIGHT VESSEL.—A light vessel, painted *red*, marked "Treaty point" on her sides, with two masts, carrying a *red* ball at the foremast head, is placed at the extremity of the shoal off Treaty point (Homuku) and Mandarin bluff, and lies in 10 fathoms, with the following bearings:—Treaty point, S.W. ¾ S.; Mandarin bluff, S.W. by W., and the mouth of the canal (just northward of the English naval stores), W. ¼ N. The vessel exhibits a *fixed red* light elevated 36 feet above the sea, and should be visible in clear weather from a distance of 10 miles.

Fog Signal.—During thick and foggy weather a bell is sounded *five times* in quick succession at intervals not exceeding *five minutes.*

Buoy.—An iron buoy painted red with a cage 10 feet above water, is moored in 4½ fathoms on the northern extreme of the shoal off Mandarin bluff, southward of the anchorage off Yokohama, with the following bearings:—Mandarin bluff, S. by E.; mouth of the canal, S.W. ½ S.; and the centre of the fort at Kanagawa N.W. ½ N.

YOKOHAMA.*—Yokohama, the most important of the ports open to foreign commerce, is built on a plain surrounded by low hills, and is environed by a canal which entirely isolates it. The only communications are by a bridge and causeway towards Kanagawa from the rear of the town on the west, and with the Yokohama bluffs by another bridge close to the sea. The residences of the foreign community occupy the east, and those of the Japanese merchants the north-west of the town. Two hatobas or landing places formed of stone piers, the ends of which are protected by a pallisade of wooden piles to break the sea, afford excellent landing; that to the south (the French hatoba) is merely two piers parallel to each other, but the northern (the English hatoba) is a camber in which boats are completely sheltered. Immediately opposite the last landing place is the English consulate, a large building with three peculiar towers. The English sick quarters are on the bluff where the camp formerly was; the old quarters at the southern end of the town having since been converted into naval victualling stores. Yokohama is connected by rail with Tokio, and the railway terminus is on the north-west side of the town. The whole of the settlement or "concession" is faced by a sea wall of stone, along which there is a broad esplanade.

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* *See* Admiralty plan:—Yokohama bay, on chart No. 2,657; scale, $m = 2 \cdot 0$ inches.

Yokohama exports tea, raw and manufactured silk, lacquered goods, vegetable wax, oil, antlers, cotton, and rice in small quantities. For the Chinese market, paper, camphor, flour, peas, beans, seaweed, isinglass, beche-de-mer, and dried shell fish.

Yokohama chiefly imports yarns, shirtings, woollen cloths, Italian cloth, metals, tin plates, and kerosine, the total value in 1879 being 4,665,200*l.* The greater part of the exports are sent to the United States. During that year 53 foreign vessels entered from the China ports, aggregating 84,817 tons, and from Japanese ports 885 vessels, amounting to 492,912 tons, the latter being an increase of 47 vessels (37,461 tons) as compared with 1878. The Japanese Mail Steamship Company (Mitsu Bishi) now provide the only regular steam communication between Yokohama and the other ports of Japan, and Shanghai. There is fortnightly communication with Hong Kong.

At the head of the bay and on its north side stands the town of Kanagawa, one of the first ports opened to foreigners, but this being an inconvenient situation for a settlement it was changed to Yokohama on the south side, as being a more eligible position for business communication. The water also is deeper for anchorage and more convenient for the landing of boats and merchandise than at Kanagawa, where it is so shallow that at low tide the sea retreats to a considerable distance from the shore.

Kanagawa is subject to frequent shocks of earthquake. It is situated on the Tokaido or imperial highway to Tokio (Yedo), and British subjects are free to go where they please within the following limits—from Kanagawa, 10 *ri* (21 miles) in any direction except towards Yedo, the boundary in that direction being the river Logo, which flows into the bay of Yedo between Kawa saki and Sinagawa, the southern suburb. A Japanese guard house is situated at the river Logo, and all persons (excepting officers in uniform) passing between Yokohama and Yedo must produce a passport.

Buoy.—A red buoy with staff and cage, 10 feet above water, is moored in 4 fathoms at low water springs on the point of the spit extending from Kanagawa fort towards the northern side of Yokohama anchorage; and lies S.E. ¾ E., one mile from Kanagawa fort.

LIGHT.—From a staff painted white, on the extreme of the eastern arm of the English hatoba (landing place), is exhibited a *fixed red* light 48 feet above the sea, visible all round from a distance of about 6 miles.

Anchorage.—A good anchorage for large vessels is with Kuwan-on saki just open of Mandarin bluff, the latter bearing S. by E., and the British consulate S.W. by W. ½ W., mud bottom. Vessels of lighter draught may, if desirable, take up a position much nearer the town. Large vessels are recommended to moor.

Supplies.—All supplies, provisions, water, coal, &c., are to be procured in abundance, and ordinary repairs both to ships and engines can be easily executed.

Tides.—It is high water, full and change, in Yokohama bay at 6h.; springs rise 6½ feet, neaps 4¾ feet; with southerly winds the tide rises about 2 feet higher.

The streams in this bay are scarcely felt, but they run strong in the middle of Yedo bay, and their velocity is much increased off Futsu saki (Saratoga spit), Saru sima, and Kuwan-on saki, particularly off the latter, round which they sweep with great rapidity.

KAWA SAKI, (Haneda point) bearing N.E. ½ N. from the light vessel off Treaty point, is low and wooded. Between it and Yokohama shoal water extends 1¾ miles from the shore, its edge being marked by a buoy.

Buoy.—A red buoy with cage, is moored in 6 fathoms, with Treaty point bearing S.W. ½ W., Kawa saki, N. ½ W., and Bansu hana, E.S.E. southerly.

There is also a beacon of the extreme of Kawa saki, and shoal water extends 1¼ miles eastward from it.

LIGHT.—On the edge of the shoal extending off Haneda point is situated a screw-pile lighthouse, from which is exhibited, at an elevation of 40 feet above high water a *fixed green* light of the fourth order, visible over Yedo bay between the bearings of N.E. by E. ⅔ E., and S.S.E. ⅓ E.; and in clear weather should be seen from a distance of 8 miles.

The lighthouse, painted black and white in horizontal stripes, stands in 7 feet at low water.

TOKIO, formerly known as Yedo, the capital of the Japanese empire, is situated at the north-west part of Tokio bay, along the shore of which it extends, with its suburbs, for 8 miles, forming three distinct quarters named Siro, Soto siro, and Midrei. The first-named contains the numerous palaces of the nobles, and the palace of the Mikado, surrounded by picturesque gardens, the second is covered with handsome temples, and the third is the quarter occupied by merchants and shopkeepers. Its aspect is not imposing from seaward, as large stacks of timber and elevated ground conceal by far the larger part of the city. Five batteries also interpose between the anchorage and the city. These, with several others on the shore, have green turfed parapets and escarps faced with stone, and are surrounded by a piling of timber which is covered at high water. The suburb of Shinagawa stands on the south of the city, where are seen the low wooded heights of Goten yama, extending 2 miles along the shore. The landing place is about 1½ miles up the western mouth of the Sumida gawa, and near the railway station, close to which is the foreign "concession" (Tsukiji) and the imperial navy department. The British legation is 2 miles from the landing place, west of the Taikun's castle. The population is said to be 1,500,000.

* The small river Sumida gawa, which flows through the centre of Tokio, disembogues at the north-west part of the bay on which the city stands, thence splitting into two streams it flows southward for about 2 miles through the extensive mud flats which nearly fill up the head of the bay fronting the city. The western stream flows parallel to the city front at 2 to 3 cables distance, the channel emerging into the bay by a sharp turn to the S.S.E., from between the middle and the next western of the five water batteries; its entrance here is about 400 yards wide and from 7 to 8 feet deep at low water springs. The channel itself carries the depth of 3 feet from the entrance nearly up to the mouth of the river, probably then deepening a little. The landing places directly north of the entrance between the forts are also accessible by the same depth of water (3 feet) for 1½ miles along that part of the shore where the Tokaido or high road runs.

At high-water neaps there would be 6 or 8 feet water in this channel, according to the direction of the wind. At high-water springs there would be from 9 to 9½ feet. The canal or moat at Yedo, according to a large Japanese plan, communicates on the south with the Kori canal which forms an outer circle round the Imperial domain. One end of the canal falls into the Sumida gawa a mile above, the other into the sea a mile below its mouth. Two canals also run direct to the sea close to the river's mouth from the ditch. The northern of these runs into the former Taikun's castle, and is probably navigable, but the moat itself is not navigable, and is the undisturbed resort of numerous wild fowl.

LIGHT.—On the west side of the fort at the entrance to Tsukiji channel leading to the foreign concession at Tsukiji and the city, elevated 52 feet above high water, is exhibited a *fixed red* light of the fifth order, visible between the bearings of W.N.W. and S. by W. ¾ W., and should be seen in clear weather from a distance of 9 miles.

Shinagawa anchorage.—The bay fronting the city is very shoal, a bank of less than 3 fathoms water on it extending from 2 to 3 miles from the shore. The best anchorage for a large vessel is in 5 to 6 fathoms, soft mud, good holding ground, with the lighthouse on the middle fort bearing N.W. ¾ N. distant 3¼ miles; smaller vessels may anchor nearer the fort on the same bearing, but at 2 miles from the fort the depths shoal suddenly from 3½ to 2 fathoms.

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* Commander C. J. Bullock, R.N.

The COAST from Tone gawa point (where a river of the same name disembogues) round the head of the gulf of Yedo is low, with shoal water extending a considerable distance from the northern shore forming a deep bay with 7 to 13 fathoms water between the above point and Bandzu hana.

BANDZU HANA, situated on the eastern shore of the gulf about 8 miles S.E. from Kawa saki, is low, and fronted by shoal water extending 1½ miles from the shore in a westerly direction. From Bandzu hana the coast trends in a southerly and south-westerly direction for 12 miles, is low, and shoal from 1½ to 2 miles off shore.

FUTSU SAKI (Saratoga spit) is a low sandy point, having a fort at its high-water line, 8 miles S.W. from Bandzu hana. From its extreme, sands which dry at low water stretch out in a narrow tongue 1½ miles to the westward forming Saratoga spit; and shoal water extends still further westward, its outer extreme (5 fathoms) being 3 miles from the point.

Buoy.—West from this tongue, in 9 fathoms, is moored a red buoy with staff and cage, 15 feet above the water.

East from the buoy, towards the spit, there are only 5 fathoms at 3 cables, and one fathom at three-quarters of a mile. The bank of 5 fathoms trends N.E. ½ N. and S.E. by E., deepening rapidly to 10 fathoms.

Clearing mark.—To clear the shoal water extending from Futsu saki, Kuwan-on saki lighthouse should not be brought to bear westward of S. ¼ E., and by night the white light should be kept in sight eastward of that bearing. (*See* page 307.)

The COAST from Futsu saki takes an easterly and southerly direction, forming a deep bay, the northern shore of which is sandy and low, but the southern is the termination of the slopes from the high range Noko-gheri yama, and is rocky and steep-to. Shoal water extends from 1½ to 2 miles from the shore in the centre of the bay.

Kanaya point, the south-western extreme of these slopes, is steep-to and bears nearly East of the Tree Saddle on Sagami peninsula; it is at the termination of the sharp well defined ridge of the Miogani yama, a dome-shaped mountain elevated 1,090 feet. The coast from this point takes a southerly direction for 7 miles as far as Daibo saki, between which there are three small bays, off the southern of which are several rocky patches, the outer being one mile from the nearest shore.

Ghibu isi (Black rock) about 20 feet high, lies three-quarters of a mile west of the latter bay, having several reefs in its vicinity which only uncover at low water.

The peninsula of AWA, although mountainous, is less so than Idsu, and possesses much larger tracts of arable land, all of which is carefully cultivated. Its west coast is more sinuous than the opposite shore of the gulf, but only one of the bays, Tate yama, formed in it, affords fair anchorage.

The lofty mountains Miogani yama, Syeno yama, and Double hill (1,200 feet) are very conspicuous, towering above this coast. Double hill when viewed from seaward loses its dual appearance.

To the northward of these hills the country (Kadzusa) becomes much lower, and a few miles north-eastward of Futsu saki, the point off which extends the Saratoga spit, it becomes an uninteresting dead flat, encircling the head of Yedo bay.

TATE YAMA BAY, situated between Daibo saki and Su-no saki, affords shelter and good holding ground in southerly and easterly gales, but it is exposed to the westward.

The best anchorage is in about 7 fathoms, a quarter of a mile eastward of Taka sima (the easternmost of the two small but well wooded islands on the south side of the bay), with the west extreme of Daibo saki bearing N.N.W. ½ W., and Siro yama, a hill 290 feet high, S.S.E. ½ E. This hill is the north extreme of some rising ground in the south-east corner of the bay. This position is well sheltered from North round East to W. by S., but should there be any appearance of the wind veering westward, an early departure is recommended, as a heavy sea quickly sets in.

Supplies.—Water, fish, and fowls in small quantities can be obtained from the villagers residing at a hamlet situated at the base of Siro yama.

SU-NO SAKI, the east point of entrance of the gulf of Tokio is 5 miles S.W. ½ S. from Daibo saki, and when seen from the southward appears as a block of small hills, rather conical in profile, the highest, Hazama, which is green and bare, being elevated 645 feet. The point is low, with the exception of a small elevation at the north-west corner on which is an old fort. There is often a heavy tide rip off it, but there are no dangers at a greater distance than half a mile from the shore, and the point may be safely rounded at a mile. From Su-no saki to Mela head is an open bay with a sandy beach, on to which a swell is usually setting.

MELA HEAD and LEDGE.—Mela head, S.E. nearly 5 miles from Su-no saki, forms the eastern point of entrance to the Uraga channel and gulf of Yedo; it is 450 feet above the sea, the general height of the coast range northward being comparatively low. A small village is situated about half a mile to the northward. A dangerous ledge (Mela ledge) lies 1½ miles off Mela head, and 4 miles W. ¼ S. from the light house on No-sima point. Heavy breakers occur in rough weather or when a swell rolls home, but in smooth water the rocks are not seen from a distance; the water, however, is so clear that the bottom is visible in a considerable depth.

No-sima point, situated 3¼ miles eastward of Mela head, is low, the shore between them being skirted with rocky patches. At 2 miles east of No-sima point, dangerous shoals extend about 1¼ miles from the shore.

LIGHT.—From an octagonal shaped white tower, situated on No-sima point, at an elevation of 133 feet above high water, is exhibited a *fixed* white light of the first order, visible from W. by S. ½ S. to E. ½ S., and should be seen in clear weather from a distance of 17 miles.

Directions.—Gulf of Yedo.—Approaching the gulf of Yedo from the southward or westward, in clear weather the chain of islands extending southward from it are unmistakeable landmarks, and cape Idsu (page 297) can scarcely be mistaken. Omai saki, the point 25 miles westward of cape Idsu is low, while the cape, as before stated, is high, bold, and rocky. From 1½ miles eastward of Mikomoto (Rock island) a N.E. ¼ E. course will lead 4 miles north-west of Vries island, from which position the centre of the entrance of the Uraga channel bears N.E. by E., distant 22 miles. Care must, however, be observed when approaching cape Sagami not to be drawn into Sagami ura by the indraught mentioned at page 301. Should Vries island be visible this danger is easily guarded against by not bringing that island to bear southward of S.W. by S.

Vessels approaching the gulf from the eastward are recommended not to hug the shore of the south end of Awa too closely, to avoid the dangerous shoals eastward of No-sima point.

To avoid the Mela ledge and all other known dangers when rounding from the eastward, do not bring the eastern extreme of land seen, to bear eastward of E.N.E. until Tree Saddle hill is seen open of the extreme of Su-no saki bearing N. by W. ½ W.; and when rounding from the westward do not shut in this hill with the extreme of Su-no saki until the eastern extreme of land bears E.N.E. At night or in thick weather, when the light on No-sima point is not seen, soundings of 40 fathoms may be considered as indicating close proximity to these dangers.

In steering for the Uraga channel the Tree Saddle hill on the south end of Sagami peninsula will be readily recognised; and on nearing the channel the Ashika sima (Plymouth rocks) will be plainly seen on its western side. Give these rocks and the Ka yama a berth of half a mile in passing, or at night keep the *flashing* white ligh on cape Sagami in sight until the *fixed* white light on Kuwan-on saki opens out, bearing about North, when steer to pass it at one-quarter to half a mile, after which steer N. by W. ¼ W., which will lead to the westward of the buoy off the Saratoga spit. In thick weather with a strong ebb tide running care must be taken not to be set to the eastward of this buoy. (*See* pages 307 and 315.)

Continue the above course (N. by W. ¼ W.) until the light vessel off Treaty point is seen, when steer to pass to the eastward of her, taking care not to bring the light to the northward of N. ½ W. The elevated ground above Mandarin bluff, at one mile northward of Treaty point, showing to seaward in brown cliffs well wooded to the summit, will be readily recognised; the bluff being the most eastern.

The light vessel may be passed within a cable, after rounding which steer to pass northward of the red buoy with staff and cage moored on the northern edge of the bank off Mandarin bluff, and anchor as convenient.

A sailing vessel will have to make short tacks when working into Yokohama bay with a westerly wind, as north of Mandarin bluff the deep water channel is narrowed to 1⅓ miles; the lead here, however, as is the case round nearly the whole shores of Yedo bay, gives fair warning.

WORKING THROUGH the URAGA CHANNEL.—With a northerly wind a vessel after passing cape Sagami may stand across and tack close to the opposite shore, as there are no rocks at any distance off it to the northward of Kanaya point, and to the southward of the point the dangers show. If unable to fetch this point it would not be prudent to stand into the bay between the point and Uki sima, a small rocky island 150 feet high to the southward, as foul ground exists there. This bay will be readily recognised from a distance, as it is the sea shore of a valley between the Miogani yama and Sveno yama ranges, and two small hills are in the centre of it.

In making the western board, the foul ground in Kaneda bay, as well as off Senda saki, and along the shore between it and Kuwan-on saki, must be remembered. The shore of Kadsusa bay, northward of the Miogani yama range, may be approached by the lead, tacking in 5 fathoms.

If unable to fetch Kuwan-on saki on the starboard tack, be careful to tack short of the bearing for clearing the Ka yama (page 307.) Short tacks should be made when to windward of Kuwan-on saki, not shoaling towards the opposite or Kadsusa shore to less than 9 fathoms. When Saru sima bears W. by S., stand no farther eastward than to bring Kuwan-on saki to bear S. ¼ E. until Saru sima is S.W. ½ W., when the spit will have been weathered. At night do not bring the light off Treaty point to bear west of N. by W. ¼ W. until Kuwan-on saki light bears S. ½ E. Long boards may now be again made, but do not shoal on either tack to less than 5 fathoms, nor off Yokohama bluff to less than 7 fathoms. There are some shoal patches of 3½ to 5 fathoms, sand and mud, off the western side of the bay between Saru sima and Mississippi bay, but none are known at a greater distance off than 2 miles, and they may be avoided by not bringing Saru sima to bear eastward of South.

If proceeding from Yokohama to Shinagawa anchorage off Tokio (Yedo), stand out E. by N. till the house in the tree clump (of which the roof only is generally seen) of Kawa saki bears N.N.E., when haul up N.E. or N.E. ½ E. along the shore, which is skirted by a shallow shelf nearly 1½ miles broad and very steep, passing eastward of the red buoy which marks its southern edge, and passing about one mile eastward of the lighthouse (on the extreme of the bank), taking care not to decrease the soundings to less than 9 fathoms. When Kawa saki lighthouse bears west distant one mile haul up North for Shinagawa anchorage, and anchor in 6 fathoms with the southern part of the wooded heights of Goten yama bearing West, and the lighthouse on the middle of the five forts, N.W. ¾ N ; or steer in upon the latter bearing and anchor in any convenient depth, as above.

The Tides are much affected by the winds, but both flood and ebb sweep with great velocity round Saratoga spit.

The flood runs N.W. by W. and the ebb S.W. by S., about 3½ knots an hour at springs. Generally the flood stream sets a vessel on to the western shore.

ISLANDS SOUTH of YEDO GULF.—From the volcanic island Vries, at the middle of the entrance of the gulf of Yedo, extends a chain of islands and rocks some 300 miles in a S. by E. direction, terminated according to present information by the small pinnacle island called Lot's Wife, said to be in lat. 29° 47′ N.,* long. 140° 19¾′ E. These islands are all bold-to, some appearing to rise like a wall from the depths of the ocean, and they have but few outlying hidden dangers. The lead therefore in foggy weather will give little or no warning, as in some cases no soundings will be obtained with 150 fathoms line within half a mile of the shore.

The currents also in this part of the Japan stream are influenced by the prevailing winds at the different seasons, and are capricious; heavy current rips being of very common occurrence have often been mistaken for shoals. These rips are more constantly met with close to the islands and rocks than otherwise, and in the event of getting into one at night or in a fog, it may be assumed, when the vessel's position is not accurately known, that danger is near. It may be well to bear in mind that in calms, although the stream may appear to be hurrying the vessel on to an island, if the island be steep, it will always turn to the right or left on approaching within a certain distance of the rocks; not so, however, should shallow water extend any distance, when the anchor must be depended on.

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* U.S.S. *Macedonian*, 1854.

The usual set of the current through these islands is north-easterly, and the rate ranges from 1½ to 3 knots, but the islands frequently deflect it from its course, and the eddies always found on the margin of great currents are here particularly numerous and active, so that it is not unusual, especially among the northernmost of the islands and in the vicinity of the coast of Nipon, to encounter a set precisely in the opposite direction to that anticipated. Close to Fatsizio and Vries islands, at less than a third of a mile off, a regular change of tidal stream has been observed, and also between these islands and the coast.

LOT'S WIFE (Rica de Oro) or Black rock, in lat. 29° 46′ 28″ N. long. 140° 19¾′ E., is a tall pinnacle rising about 466 feet above the sea, in clear weather it can be seen at a distance of 25 miles, and bears a remarkable resemblance to a ship under all sail. There is a rock off the western extreme of the island, and there is no bottom at 20 fathoms within 30 feet of Lots wife. A cast of the lead within 8 miles of this rock gave no soundings with 160 fathoms of line. The nature of the bottom found at the deep soundings was lava-crust, shells, sponge, and marine plants. The current in the vicinity of Lot's Wife was found setting to the south-east, causing a tide rip (having the appearance of breakers on a shoal) to extend south-eastward from the island.*

PONAFIDIN or St. Peter island is about 1,176 feet in height 1¼ miles in length East and West, and visible in clear weather from a distance of 40 miles; its shores appear rugged and inaccessible. The island was discovered in 1820 by Lieutenant Ponafidin of the Russian Navy, and named by him Three Hills island, from its having apparently three hummocks. Landing may be effected in a small cove, Junk cove, on the north-east side of the island, where there is but little surf. The cove is small and the bottom rocky, affording but an insecure and very limited anchorage, but it is sheltered from all winds except from the north-east. There is a depth of 10 fathoms at the entrance to the cove, gradually decreasing to 3 fathoms at about 50 feet from the shore at its head.

The island is of volcanic formation, seamed and fissured in every conceivable way, and long bamboo grass grows luxuriantly, but there is no timber or water, and the shore is composed of lava boulders and masses of jagged rocks. The island is the resort of myriads of sea gulls, and is not otherwise inhabited. It was visited by the United States vessel of war *Alert* in 1880, and its position is given as lat. 30° 28′ 26″ N., long.

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* Commander Huntington, U.S.S. *Alert*, 1880.

140° 14′ 12″ E. There is a depth of 200 fathoms at a distance of half a mile from the island.

Shelter.—A steam vessel caught in a gale in the vicinity of either Aoga sima or Ponafidin island could obtain shelter by keeping close under their lee.

SMITH ISLAND.[*]—H.M.S. *Tribune* passed this island in 1859, and describes it as a high pinnacle-looking rock, in lat. 31° 15′ 0″ N., long. 139° 52′ E., the observations made by the *Alert* however place this island in lat. 31° 27′ 8″ N., long. 140° 2′ E.[†] It is about 421 feet in height, three-quarters of a mile in circumference, with heavy breakers extending apparently a quarter of a mile from it, and a small rock close to its north side. The *Alert* failed to find bottom anywhere round the island.

San Francisco island.—The German war vessel *Hertha* in 1875 and 1876 passed an island described as small and steep with a rock about 2 cables from its south-east side. The position assigned to this island is lat. 31° 29′ N., long. 140° 14′ E., but it is considered to be doubtful.

Volcano island, reported as being only 40 feet in height, is said to lie in lat. 31° 21′ N., long. 139° 53′ E.; its existence is, however, doubtful.

BAYONNAISE, in lat. 31° 55′ 15″ N., long. 139° 54′ 18″ E., is a group of sharp pointed rocks elliptical in form, 2 cables long north and south, with several hummocks on it, its northern summit being about 30 feet in height; several rocks extend a quarter of a mile off its north-west and north-east sides.

AOGA SIMA in lat. 32° 28½′ N., long. 139° 43¾′ E.[‡] is about 1,000 feet in height, of irregular volcanic formation, 3 miles long and one mile wide, and it is visible 36 miles off in clear weather. Its coasts are steep, and the only landing place is on the north-east side, where there is a pointed rock about 8 feet above water, at a short distance from the land. The landing place can easily be distinguished by this rock and some huts in the vicinity. The shore at the landing place is of small boulders and stones, and landing through the surf is only practicable in the native boats. The island contains between 200 and 300 inhabitants, the descendants of criminals, and it is cultivated on the north and north-west sides. In case the services of the natives are required the best articles wherewith to remunerate them are food, fishing tackle, and cutlery. Barley, peas, beans, sweet potatoes, and daikon (Japanese radish) are grown. There are no springs of water on the island, rain water being collected in rude cisterns or wells. There are a few cattle on the island and a little tea is grown, but there is very little timber. No water, fuel, or stores of any kind can be procured, but fish are said to be abundant.

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[*] Capt. Smith, ship *Heber*, 1851.

[†] The island seen by the *Alert* is considered to be identical with San Francisco island placed on the charts in the same latitude, and about 12 miles eastward.

[‡] Depends on the observations of Commander Huntington, U.S.S. *Alert*, who visited this island, Bayonnaise, Ponafidin, Smith island, and Lot's Wife in 1880, and on the observations of Captain Knorr of the German war vessel *Hertha*, 1875 and 1876. Aoga sima was, until lately, placed on the charts 9½ miles too far northward.

FATSIZIO (HACHIJÔ) ISLAND, the most southern of the islands visited by the *Actæon* in 1861, is 8⅓ miles long, N.W. by N. and S.E. by S., and 4 miles wide at its broadest part. In shape it is nearly an oblong, rounded at the north-west end, while at its south-east end a slight curve forms a bay, the observation spot at which (close to some small huts) is in lat. 33° 4′ 24″ N., long. 139° 50′ 24″ E. Anchorage was obtained off this bay in 16 fathoms, sand and gravel, at less than a mile from the shore, but exposed from S.S.W. to N.N.E., and a vessel would always be liable to experience a heavy swell. There were 30 fathoms, with a bottom of dark sand, at about 2 miles off this shore, but the rest of the coast line appeared to share the bold features and to be as steep-to as the generality of these islands.

This island is a penal settlement of Japan. Its northern part is the highest, where a mountain reaches an elevation of 2,840 feet. At the base of this mountain and creeping up for some distance on its west side, is an extensive settlement, while in several places along both shores, are little hamlets and villages, so that the island would appear to support a considerable population. A tract of low land in the centre of and extending across the island is well cultivated. To the southward of this the land again assumes a considerable elevation, but does not reach the altitude of the northern part. Approaching from the eastward the island appears as two.

Water.—At the south-east end of Fatsizio are two or three small streams of good water falling down the rocks, and in fine weather and smooth water, boats may readily obtain an abundant supply.

Tides.—It is high water, full and change, at Fatsizio island at 6 hrs.; springs rise 5 feet.

KODSINE is a small and nearly oval shaped island, 1,820 feet high, 1½ miles long, and nearly one mile broad, lying westward of the highest part of Fatsizio, and separated from that island by a channel about 2 miles wide, which has not yet been sounded. Some small rocks, as is also the case with Fatsizio, are found quite close in shore, but no off-lying dangers are at present known, and there is no bottom at 53 fathoms, a little more than a mile from its western shore. A small population is to be found on the lower part of the island.

BROUGHTON ROCK (Kanawa), in lat. 33° 39′ N., long. 139° 18′ E., is a small inaccessible islet about 60 feet high, flat topped, and so bold that at about a third of a mile from its north-east side no soundings could be obtained with 180 fathoms line.

The north-easterly current in the neighbourhood of this islet was found to be particularly strong, running nearly 4 knots an hour.

MIKURA, lying about 17 miles north-east of Broughton rock, in lat. 33° 52′ N., long. 139° 35′ E., is high and bold.

MIAKI SIMA, the flat summit of which, 2,690 feet high, is in lat. 34° 5′ N., long. 139° 31′ 35″ E., has its north-east end a little more elevated than the south-west end.

There is a cluster of rocks about 2½ miles to the south-west of Miaki, and Broughton says, "there are, in addition, some black rocks 2 or 3 miles from the eastern point of the island."*

REDFIELD ROCKS (Sanbon take), are the most western of the chain of islands and rocks south of the gulf of Yedo, and the most dangerous of the whole group. They consist of two patches of black rocks extending nearly 3 miles N.N.E. and S.S.W. The southern rocks, in lat. 33° 56′ N., long. 138° 48¼′ E., are the highest, about 20 feet above high water, while the northern are only about half that height. Nearly midway between the patches is a flat rock, over which the sea breaks heavily, and the heads of two or three small rocks crop up around it. There is said to be deep water between the flat rock and the northern patch, and the channel is reported to be clear, but except in a case of sudden emergency it would not be prudent to attempt passing through.

The hand lead will afford no warning until close upon this dangerous cluster, and in thick weather the islands in the vicinity, the nearest being Kosu sima, N.E. ¼ E. 20 miles distant, would not be seen; in fact, seeing the islands the dangers themselves would be visible, and therefore easily avoided.

A depth of as little as 12 fathoms was found when passing along the west side of these rocks, about equidistant from either group. At half a mile from the south and principal cluster are depths of 30 fathoms, rocky bottom. The flat rock also is connected with the south rocks, and lies close to them.

A depth of 70 fathoms, gravelly bottom, was obtained about 4 miles northward of the rocks, but the depths increased as they were approached, and at 2 miles west of their centre there was no bottom at 130 fathoms. The current in their vicinity set on one occasion about N. by E., and its rate was from 2 to 3 knots.

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* Between Miaki island and Kosu sima the temperature of the surface water has been noticed to rise (in December) from 53½° to 66¼° Fahr., indicating the Kuro-siwo (Japan stream). The air was saturated with moisture, and there was a high sea.

ONOHARA is a small group W.S.W. 5 miles distant from Miaki, composed of a cluster of seven or eight high detached rocky pinnacles, the centre one being perforated in two places. When bearing from E.N.E. to N.E., they appear as one islet.

KOSU SIMA, in lat. 34° 12¼′ N., long. 139° 9¼′ E. (centre), and elevated 2,000 feet above the sea, is 3½ miles long N.E. and S.W., and may be recognised by a remarkable snow white cliff on its western side, and a white patch on its summit (volcano), to the northward of the cliff. There is a safe channel 15 miles wide between Kosu sima and Miaki.

Two small rocky islets lie close together about half a mile off the centre of the eastern shore of Kosu sima.

Onghashi rocks.—About 2 miles westward of the south-west point of Kosu sima are the Onghashi rocks, which should be given a safe berth, as their jagged appearance would lead to the belief that there are many hidden dangers in their immediate neighbourhood.

SIKINE SIMA, 1½ miles long N.N.E. and S.S.W., lies 5 miles north east of Kosu sima; it is low, with a small islet off its north end. One of the vessels of the American squadron passed between these islands and saw no danger; there is therefore reason to believe that the channel is safe.

NII SIMA is about 1½ miles north-east of Sikine, and from its broken outline appears from a distance as several islands. Its extent is 5 miles, north and south, and its most elevated part is 1,490 feet above the sea. There is a small low islet (Haia sima) a short distance off its south-east point, and another (Chi-nai sima) close off its western shore.

UTONÉ is a conical islet, 660 feet high, lying N. ½ E., about 2½ miles from Nii sima; detached rocks lie near its shores.

TO SIMA, bearing N. ½ W. 2 miles from Utoné, is one mile in diameter, pyramidal shaped, and its summit 1,730 feet above the sea.

VRIES ISLAND (Idzu no Oö sima) the largest and most northern of the chain fronting the gulf of Yedo, is 10 miles N.N.E. of To sima, its south-eastern point being in lat. 34° 40′ N., long. 139° 25½′ E. A bluff forming the north-west point of the island (observation point), is 350 feet high, and when seen from the north-east or south-west at a distance it appears as an island. The island is oval shaped, about 9 miles in extent N.N.W. ½ W. and S.S.E. ½ E., and 5 miles wide; and its summit, Mihara, an active volcano,* attains an elevation of 2,550 feet. Over its summit a white vapour cloud is generally floating, and frequently, at night, it brightly reflects the glare of the subterranean fires in the crater beneath, forming in clear weather a conspicuous landmark, visible by night or day, for many miles.

There are several villages on the island, and a population of about 5,000. The coast is free of all danger, with the exception of a few detached rocks and boulders lying close to it. The principal village Niijima or Motomura, is on the north side, off which a narrow bank affords a precarious anchorage in from 12 to 18 fathoms. Another considerable village (Habu), having the advantage of a junk harbour, is situated at the south-east point of the island. Landing may be effected at the north village, or in the junk harbour. The soil consists entirely of volcanic scoriæ and pulverised black lava, and the vegetation is limited to pine trees, cherry trees, and camellias. The chief occupation of the inhabitants is cutting firewood and fishing; they have been found civil and hospitable, but averse to strangers visiting the volcano.

EAST COAST OF NIPON.†—From No sima point the coast trends in an easterly direction for 3 miles to Siamatsu, thence north-east to cape Erratatsi (cape King), and thence in a north and easterly direction, about 30 miles to Iwa-wada, the south-east extreme of Nipon, whence it trends north 8 miles, to Ohigasi saki (cape Blanco). The shore is wild and rock-bound; between Mela head and Erratatsi (cape King) the hills skirt the shore, but have no cliffs, and the beach is alternately sandy and rocky. Between cape King and Ohigasi saki it is high and well wooded, the projecting points being generally rugged cliffs of yellow clay or gravel; the high land terminating in the neighbourhood of Ohigasi saki in a long backed hill with two thumb-shaped pinnacles, fronted by a bold chalky cliff. This coast is frequently obscured by fog and is difficult to identify when coming from the eastward. Vessels making for the gulf of Tokio (Yedo) from that direction are liable to be set out of their reckoning by the Japan stream, and should the weather be foggy great caution is necessary, on nearing this coast, which, however, may be approached (except in the vicinity of Mela ledge) to within 1½ miles. The temperature of the sea often affords a useful guide, and the bank of sounding skirting the shore and projecting seaward gives timely warning if attended to. During the summer months there is generally an uneasy swell forming heavy breakers along this coast. Mela head often shows out in relief, when all the coast eastward is obscured by fog.

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* The last eruption of Mihara volcano, Vries island, commenced on 27 December 1876, and lasted till 6 February 1877.

† Information relating to East coast of Nipon, between Mela head and the Tone gawa, is from the remarks of Lieutenant A. Carpenter, R.N., commanding H.M. Surveying vessel *Magpie*, 1882.

Currents.—Northward of Su no saki the flood and ebb streams are regular, but southward of that point the Kuro Siwo (Japan stream) will in summer be found setting strong to the south-eastward. It enters the gulf of Tokio on the west side, and sweeping round in a curve the apex ot which is regulated by the ebb or flow of the tide in the gulf, sets out on the east side, so that a vessel entering from the eastward will nearly always experience a current against her off Mela ledge, of 2 to 4 knots in summer. A line of overfalls marks where the out-setting stream impinges on the main body of the Japan stream flowing to the north-east. From No sima to Iwa-wada the current sets at the rate of one to 2 knots an hour following the coast; but it is weak in shore and vessels making for the gulf will do well to keep as near the coast as safety will permit, that is at 1½ miles. At Iwa-wada the stream leaves the coast, and continues its course to E.N.E. for 2 or 3 miles after which it sets N.E. The difference of temperature here in summer between the Japan stream and the adjoining water is sometimes only 1°, but farther northward the difference is more marked.

CAPE ERRATATSI (KING), has over it a wooded peak, Takaska yama, 759 feet high, which forms a useful land-mark, it being the highest summit of the Mela promontory.

Rocks, extend, 5 cables in a N.E. by N. direction from the cape.

Anchorage.—North of cape Erratatsi is a sandy bay, with comparatively low land behind it. Temporary anchorage may be had in 8 fathoms, sandy bottom, off this beach, sheltered from westerly winds. To the south-east of the small village in the centre of the bay the depths are irregular and shallow; this position should be avoided.

The COAST.—At the north end of the bay above mentioned is a cultivated wooded hill, conspicuous when viewed from the eastward, and thence a rock bound coast with dark green hills rising abruptly from it trends E.N.E. 6 miles to Kitsu ura. At about 4 miles from the conspicuous hill is a low point with a village on it.

Rock.—A rock, awash at low-water spring tides, lies 5½ cables from the shore off the above-mentioned point, and should be given a wide berth: from it Kitsu point bears N.E. ½ E. distant $1\frac{7}{10}$ miles.

KITSU URA.—Kitsu point the west extreme of Kitsu ura appears from the westward as a broken rocky point extending seaward half a mile. The western shore of the bay is broken, and has one or two needle like summits, and a sharp topped islet lying off it.

The head and eastern shore of the bay consist of a long beach, backed by low trees behind which a broad valley extends in a W.N.W. direction. A large village is situated on the eastern shore.

The bay is very deep, the line of 100 fathoms entering it; this is the only point on the coast not protected by a bank of soundings. A high dark rounded peak 1,341 feet high, situated north-east of Kitsu ura, is the highest land between cape King and Inu-bo-ye saki.

Rocks.—A smooth rock 5 feet above high water lies N.E. ¾ N. one mile from the extreme of Kitsu point; and half a cable E.S.E. from the rock are several rocky heads, on which the sea breaks.

Ko minato point, 5 miles E.N.E. from Kitsu point, is the west extreme of a line of cliffs, and has off it some detached pillar shaped rocks. Northward of the point is a small harbour where junks shelter, off the entrance to which is a flat rock which covers and uncovers. From here the coast continues cliffy as far as Ohigasi saki, the cliffs being broken and skirted by reefs, through which are channels to numerous sheltered anchorages for junks.

Naming-awa, a small harbour much frequented by junks lies 2 miles E. by N. from Ko minato point. The fishermen here exhibit occasionally a *fixed* white light on a scaffold, some 200 feet above the sea. The coast in the vicinity is fringed with reefs.

Shoal.—A patch of 3 fathoms lies 7 cables S. ½ E. of the eastern entrance point to Naming-awa, to clear which Hachimann saki (Katsu ura) should not be brought to bear east of N.E. by E. ¼ E. Between the shoal and the reefs skirting the shore the depths are irregular.

KATSU URA, about 1½ miles, eastward of Naming-awa is the only harbour between Mela head and Sendai bay that affords protection from easterly winds; and it can only be considered as temporary refuge, as the holding ground is not good, and the anchorage is limited in consequence of a rocky shoal (on which is a depth of 2 fathoms) lying near the centre of the bay. The shores of the bay between Kurugu hana, and the head of the bay, which is sandy, are cliffy and broken. From the northernmost cliff a ledge of rocks projects 2 cables towards the 2 fathoms shoal in the centre of the bay. Junks moor between the ledges to rock hewn bollards. The village of Katsu is at the east end of the sandy beach at the head of the bay. Several small fishing villages are situated on the adjoining shore.

Hachimann saki, a narrow cliffy promontory, on the ridge of which are several conical mounds and clumps of trees, forms the eastern side of the harbour. Irregular depths extend nearly one mile south of the point.

A reef of rocks, which never completely covers, lies 2 cables N.N.W. from Hachimann point.

Directions.—Steer in for the centre of the sandy beach at the head of the bay bearing N. by E. ¾ E. until abreast of Hachimann saki, when a small rock, 6 feet above water, will be seen ahead and nearly in line with a clump of trees close down to the shore. Steer for it on that bearing until the highest part of the reef N.N.W. of Hachimann bears S.W. ¾ W., distant about 2½ cables, when anchor in 7 fathoms, sandy bottom. Only steam vessels should resort to this anchorage, as easterly winds never last for any length of time, and should the wind veer to the southward of S.S.E., a heavy swell rolls in.

Supplies.—Fish, fowls, eggs and water may be obtained at Katsu ura.

Tides.—It is high water, full and change, at Katsu ura at 5h. 10m. (approx.); springs rise 5½ feet, neaps rise 4 feet.

Caution.—Rocks, on which the sea occasionally breaks, and foul ground extends 8 cables off shore at one mile east of Hachimann saki, its extreme bearing E.S.E. from that point. Care should be taken not to close the land in this locality within 1½ miles.

Iwa-wada point lies 4 miles N.E. ¾ E. from Hachimann saki, with an open bay between, and when making for Katsu ura from the eastward care must be taken not to mistake it for the latter point. The extreme points of this open bay bear N.E. and S.W. from each other, whereas those of Katsu ura are nearly east and west. Tide rips and overfalls are frequent off Iwa-wada.

The COAST, from Iwa-wada point trends N. by E. 4 miles to Ko-hama consisting of bold steep stratified cliffs much disentegrated by the action of the sea; which has formed a bank extending 12 miles eastward off this coast. Depths of 10 fathoms are obtained at an average distance of 1½ miles from the shore and vessels should not approach closer.

Northward of Ko-hama the bank of 10 fathoms extends about 7 miles from the shore, but the bottom is level at that depth to within 3 miles of the shore.

OHIGASI or DAITO SAKI, a bold wooded headland, 7 miles north of Iwa-wada point is the northern termination of the cliffy coast, which in its immediate vicinity is of a whitish colour, with several detached rocky pinnacles at about one cable from the foot of the cliffs. In the neighbourhood of the cape irregular depths extend 2 miles from the shore, but more to the northward the bottom shelves gradually, and affords good holding ground, with westerly winds.

Anchorage, in 4 to 7 fathoms, mud and sand, may be had, with the northern cliff of Ohigasi saki bearing southward of West. With a high ground swell from the southward or south-east the anchor may drag.

The COAST, from Ohigasi saki trends northward and north-eastward forming a long open sandy bay as far as the cliffs of Inu-bo-ye saki promontory; the bay is shallow, but the bottom shelves up evenly. A vessel passing 4 miles from Ohigasi saki will carry depths of 13 to 25 fathoms, sand, as far as Inu-bo-ye saki.

INU-BO-YE SAKI, a projecting, rocky, headland with a smooth bare summit, 242 feet high, stands out in bold relief from the low coast to northward and south-west from it; 33 miles northward of Ohigasi saki. The south shore of the promontory is a black perpendicular cliff about 140 feet high capped by a thick red, surface soil; the south-east point is low and rocky, and foul ground extends 4 cables from it. The outer shore of the promontory trends northward 3 miles to a pillar-shaped rock, and thence north-west to the mouth of the Tone gawa, and is very rugged; rocky ledges extending 3 to 4 cables off it. On these ledges sea lions may be often seen.

LIGHT.—From a circular, white lighthouse, 103 feet high, situated on Inu-bo-ye saki, is exhibited at an elevation of 168 feet above the sea, a *revolving* white light of the first order showing *a bright flash* once *every half minute*, which should be visible in clear weather from a distance of 19 miles seaward. The light is obscured towards the land over an arc of 104°, or between the bearings of E.N.E. (through East) and S. ¾ E.

Anchorage.—Temporary anchorage may be had in 4 fathoms, sand, at 2 miles west of the south-east point of Inu-bo-ye saki; sheltered from winds between N.W. and N.E.

The TONE GAWA is the outfall of a series of streams and lakes, the waters of which take their rise not far from Tokio. Only the smallest craft can cross the bar at high water and on a fine day; with the wind fresh from East or N.E., or with a heavy swell on, the bar is impassable even for boats, as the sea breaks in 4 to 5 fathoms. From the southern shore at the entrance a reef of black rocks, 5 to 15 feet high extend 2½ cables northward, across the river's mouth, and at 1½ cables N.N.W. of the outer rock of this reef is a sunken rock on which the sea occasionally breaks. The northern shore at the entrance is low, and from it a sandy shoal spit extends to within 2 cables of the reef of black rocks.

A rocky barrier, extends across the channel about half-way in, having on it a depth of only 7 feet at low water. Inside the sandy spit the river widens, but is shoal. There is a pilot office in the town of Chöosi, situated on the south bank of the river. Chöosi contains a population of about 25,000, chiefly fishermen, and there is daily postal communication with Tokio by means of steam launches, on the river.

Supplies.—Provisions, with the exception of fish, are scarce, but firewood and charcoal are plentiful.

Tides.—It is high water, full and change, at the river's entrance at 5h. 45m. (approximately); springs rise 4½ feet, neaps rise 3 feet. Anchorage, may be obtained during westerly winds, in 6 fathoms, sandy bottom, at 7 cables north of the northern rock of the reef; it, however, cannot be recommended.

The Coast from Tone gawa to Machama, 35 miles distant in a northerly direction, is wooded. From Machama to Kawajiri, a populous fishing village, 18 miles farther northward, the shore is bounded by low cliffs. North of Kawajiri the hill ranges commence. There are no known anchorages between Kawajiri and Sendai bay, a distance of about 110 miles.

Toyoma, point situated about 80 miles northward of the mouth of the Tone gawa is said to have a dangerous reef extending off it for 2½ miles in an E.S.E. direction.[*]

SENDAI BAY in latitude 38° 20′ N. midway between the gulf of Yedo and Tsugar strait, is included between Matsu sima on the west and Amitsu-hama island on the east, is about 20 miles wide; the land surrounding it being mountainous and in places thickly wooded; the mountains on the western side of the bay (in the interior) rising to several thousand feet in height. The land north of it is deeply indented, high, and steep, and apparently thinly populated, fishing boats being seen only off Simidzu.[†]

On approaching Sendai bay, the sharp wooded summit of Kingkasan island, is a conspicuous object.

The group of islands in the N.W. corner of Sendai bay should not be approached nearer than 2 miles, as reefs and rocks extend off them to a considerable distance, and there is no anchorage even for a small vessel on the western shore of the bay.

MATSU SIMA BAY.—The southern entrance of this extensive but shallow bay is easily recognised by the numerous islets and rocks covered with trees that lie off it. In the southern entrance, which is obstructed by low reefs, and sunken rocks, is the village of Sabusawa and the small port of Ishibama, where small steam vessels call. The northern entrance to Matsu sima bay (4 miles to the northward) is completely blocked up by a sand-bank that dries at low water, but good shelter for two or three vessels may be obtained off it in 5 or 6 fathoms, mud bottom, open only to the east.

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[*] A Japanese steam ship was wrecked on a rock 1¼ to 1½ miles E.S.E. from Toyoma point July 1882: also a Pacific mail steam ship previously.—"Japan Weekly Mail," 30th Sept. 1882.

[†] Several large fishing "look-outs" are often found moored (in 11 fathoms water) in Sendai bay. These structures appear to be fixtures to which are attached nets, and by strangers would not unlikely be mistaken for beacons marking rocks.

When making for this bight a remarkable pinnacle rock about 60 feet high with trees on its summit, stands off the coast, and there is a reef of rocks just northward of it. Anchorage may be obtained with north-westerly winds, northward of this pinnacle rock, in about 6 fathoms.

Matsu sima harbour has moderate depths with mud bottom; at 10 miles south of Matsu sima and 7 miles from the shore the depth is 18 fathoms, and 16 at 2 miles from the entrance.

Kita Kami river, a stream of considerable importance, is the largest of two rivers in the northern part of the bay; it is said to be navigable for junks for 70 miles, and boats can reach Morioka, the capital of Nambu, a distance of 120 miles (northward).

The Kita Kami traverses the provinces of Nambu, Mutsu, and Sendai.

LIGHT.—A *fixed* white light, elevated 52 feet above the level of the sea, is exhibited from a white staff, on the eastern bank at the entrance to Kita Kami river on the north side of Sendai bay.* It should be visible from a distance of 6 miles in clear weather.

Ishinomaki is a village at the mouth of the Kita kami, and about 3½ miles to the eastward of the entrance is the fishing village of Watanoka situated on the western entrance to an extensive basin, nearly surrounded by high land. The entrance to the basin is narrow, but the depth in it is not known.

Anchorages.—Amitsu-hama island is rocky and rises steeply in bare hills; it has deep water close to on its north-east side, and may be passed within 2 cables, but a reef extends some distance off its south-east point. Depths of 16 to 19 fathoms will be found between the island and Nagasama, and anchorage for large vessels may be obtained in 12 to 9 fathoms, sand, off the north end of the island. The hills on the north part of the island being covered with coarse grass appear bare.

The western side of the island is indented, and the second bay abreast the north end of Nagasama island is half a mile wide, affording anchorage in 7 to 9 fathoms, mud. This bay may be recognised by its having the only white sandy beach in the vicinity, and from a wooded islet lying off its northern point.

Both these anchorages afford shelter from North and East winds, but a heavy sea is thrown in by winds from East (round southerly) to N.W.

Nagasama and Tasiro, are two islets lying north-westward of Amitsu-hama island N.W. and S.E. of each other, Tasiro is the longest and most southern. They are of nearly the same height (150 feet); off the south-east end of Tasiro is a small islet. A single rock which dries, lies East two cables from the southern extreme of Nagasama.

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* Kita kami light consists of a lantern similar to a ship's masthead light, and being in front of the town, it can with difficulty be distinguished from the lights of the houses and junks. There is said to be an indraught into Sendai bay.

At 10 miles from the coast inland, there is a high, easily recognisable mountain, about 4,600 feet high, in lat. 39° 28′ N., long. 141° 41′ E., approximately; unfortunately it is frequently obscured by clouds, and points of recognition on this coast are much wanted.

A similar island is seen 5 or 6 miles south of the port of Yamada.

KINGKASAN (Goldmine island), dedicated to religious purposes, is resorted to by pilgrims from all parts of Japan ; a peak, 1,000 feet high and wooded to the summit, is seen from nearly all parts of Sendai bay; the deer on the island are numerous and are considered sacred. Mica in large quantities is found in the soil. The island is bold, and may be passed close to.

Between this island and the mainland a depth of 3 fathoms can be carried by passing at one third the distance from the island ; there is anchorage on the south side of the narrows.*

LIGHT.—From a circular granite tower on the east side of Kingkasan island, at an elevation of 178 feet above the level of the sea, is exhibited a *fixed* white light of the first order, visible from seaward (through an arc of 216°) between the bearings of S. by W. (through west and north) and N.E. ½ E. and should be visible in clear weather from a distance of 19 miles.

Fog signal.—A steam siren will give a blast of *five seconds* duration at intervals of *fifty-five seconds* during thick weather, fogs, or snow-storms.

Aikawa,† near Kingkasan, in lat. 38° 19′ N., long. 141° 34′ 10″ E. (*approx.*), is a safe anchorage and is the first sheltered spot for vessels bound to the northward from Yedo gulf. It is easy of access, being situated behind the cape, immediately west of Kingkasan, sheltered from the south-west by the islands of Amitsu-hama and Tasiro, which lie nearly a mile off the coast, and are joined by reefs. The entrance is by the channel between the cape before mentioned, and the south-east point of Amitsu-hama ; off both these points there are reefs. The light now shown from Kingkasan island will guide to its position. The reef projecting 3 cables from the southern cape is dangerous, as the sea breaks on it only when the wind blows hard, or when there is a heavy swell.

It is not recommended to pass inside Hira sima, Asi sima, and their contiguous groups lying northward of Kingkasan.

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* *See* Admiralty plan:—Anchorages on the east side of Sendai bay, on sheet of plans No. 208 ; scale, *m* = 1·0 inch.

† *See* Admiralty plan :—Aikawa anchorage, on sheet No. 208 ; scale, *m* 7·0 inches.

KINGKASAN to YAMADA.—The coast between these places is at present but little known to navigators; it presents a deeply indented outline, probably concealing some fine harbours; those of Kama-i-shi and Odzutsu being the only ones known. The shores appear bold.

KAMA-I-SHI HARBOUR,* in lat. 39° 16′ 30″ N., is a spacious inlet, a little over one mile wide at its entrance, and 2 miles deep in a westerly direction, affording a secure anchorage sheltered from all winds. The shores of the inlet are broken and rocky forming several bays; that in the north-west corner of the inlet being the largest; at its head is a sandy beach of over half a mile in extent, at the north extreme of which is the town of Kama-i-shi, and at the south extreme is the mouth of the river Oahashi gawa, near which are a few houses. Kama-i-shi is more easy of access to a sailing vessel than Yamada harbour, which is situated 10 miles to the northward.

Kama-i-shi is not an open port, and at present there is no traffic whatever. At about 10 miles inland is a district abounding in iron ore of good quality, which will probably soon be worked by the Government. A railway is in course of construction, as also a pier in connexion therewith.

Mataga saki, the northern entrance point, is faced with cliffs, and off it rocks above and below water extend a distance of 3 cables. When entering the harbour a mid-channel course should be kept between Mataga saki and the southern shore, until the town of Kama-i-shi opens out and the *red* beacon (on the reef, south-west of the town) bears N.W. by W., when haul up for it, and steer for the town, passing about one cable south of the beacon.

Reef.—There are two rocks near the centre of the harbour, lying north and south of each other, and about a third of a cable apart. On the northern rock there is a depth of 6 feet at low water, and on the southern rock 2 feet. A black buoy is moored immediately north of the north rock.

Beacon.—The southern rock is marked by a *red* beacon, consisting of a massive stone foundation, on which stands an iron post, surmounted by a cage, over a triangle, which is 19 feet above high water. Vessels must not pass eastward of the beacon.

Supplies.—Fish, fruit, eggs, fowls, and fresh water can be obtained.

Tides.—The rise of tide is about 3 feet.

Sangan sima, about 3 miles N.E. from the entrance to Kama-i-shi harbour, is about half a mile long east and west, steep, and with a wooded summit. The island lies about three-quarters of a mile off the coast.

On the south-west part of Sangan sima are some white quartz boulders, and also on the cape N.W. of the island. Sangan is not distinguishable from the coast at a distance of 6 or 7 miles, excepting when approached from the northward.

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* *See* Admiralty plan:—Kama-i-shi harbour, on sheet No. 208; scale $m = 1\cdot95$ inches.

ODZUTSU HARBOUR,[*] in lat. 39° 23′ N., long. 141° 55′ E. (*approx.*), is three-quarters of a mile wide at its entrance, opening within it to a spacious double bay, nearly 3 miles in depth W.S.W. and E.N.E. In the northern bay is the village of Odzutsu on the north shore, and on the sandy beach at its head that of Kirikiri; and off this beach the water is shallow right across the head of the bay for a distance of 4 cables.

The north-western shore of the southern bay is shallow for a distance of nearly 3 cables. Small rivers flow into both bays.

The depth of water over the harbour varies from 27 fathoms at its entrance to 11 fathoms at the anchorage, 4½ cables south-west from the mole at the village of Odzutsu; the holding ground (black mud) is good.

At 3½ cables from the north shore of the inlet, and nearly 6 cables west of the northern entrance point, is a small islet, on which is a ruined temple. From the islet a reef extends towards the shore for a distance of 3 cables, nearly joining it, and forming a natural breakwater, protecting the anchorage off Odzutsu from any heavy sea.

The harbour is surrounded by high, thickly wooded, mountains, about 1,200 feet in height, rising abruptly from the coast, and is open only to winds from E.N.E., from which, however, a vessel anchoring off Odzutsu village would be perfectly sheltered.

The entrance to Odzutsu harbour is open to the north-east; its southern and eastern entrance point being a long narrow peninsula jutting far out into the sea; from its extreme, reefs extend half a mile or more in a north-easterly direction. On the south side of this peninsula is a large island, which serves as a guide to the harbour.[†]

Supplies.—Fish is plentiful.

YAMADA HARBOUR,[‡] a large circular basin surrounded by mountains upwards of 1,000 feet in height, is entered by a broad pass or strait running S.W. between high bold shores, in which there is a depth of 20 to 50 fathoms: it is a magnificent harbour, perfectly land-locked, and with good holding ground. It may be run for by a steam vessel requiring shelter at almost any time with perfect confidence. On the north shore is the village of Ösawa, south of which, on a sandy beach at the head of the bay, is the town of Shimo Yamada. The harbour is spacious, but the water is too deep for anchorage except off Yamada.

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[*] *See* Admiralty plan: — Odzutsu harbour, on sheet of plans No. 210; scale, $m = 1 \cdot 75$ inches.

[†] On the 14th May 1877, the tide rose suddenly, without any appearance of a wave or roller, flooding the villages on both sides of the harbour. This phenomenon occurred at intervals throughout the day from 10 a.m. to 6 p.m., the intervals becoming shorter and shorter, until at the latter hour, the water rose and fell 10 feet every 5 minutes.

[‡] *See* Admiralty plan:—Yamada harbour, on sheet No. 210; scale, $m = 3 \cdot 0$ inches.

Oo sima and Ko sima, two islets, lie at the head of the harbour off the mouth of the Ori-kasa kawa; they are surrounded by a shoal flat, and from the west side of the latter projects a sandy spit.

Kuma no saki, a point immediately east of the village of Osawa, has rocks and shoal ground extending nearly 2 cables from it, and a ledge of less than 10 fathoms on it further projects southward, to a distance of 4½ cables from the point.

A reef lies off the entrance to Ö ura, a bight, on the south side; and another lies 1½ cables N.N.E. of the small rock Tatsu-gami sima, 3 cables N.E. of the former.

It is shallow between the two islands (Oo sima and Ko sima) at the head of the harbour. The small island Ko sima is in lat. 39° 27′ 17″ N., long. 141° 59′ E.

Caution.—During spring when the westerly winds still prevail, fierce gusts of wind come down off the mountains endangering a vessel lying at anchor in the N.E. part of the bay, parting her cable. It is, therefore, advisable to have two anchors down at the time of the year.

Directions.—Approaching from seaward or southward, the many islets south of Yamada render it difficult to at once make out the entrance, but either from northward or southward a safe course will be to steer for the eastern extreme of the land seen, which will lead up to the harbour. The cliffs of the peninsula which forms the eastern side of the harbour are of a reddish colour, and there is a peculiar arched rock close to the shore, about the middle of the peninsula. In the bay south of Kama-i-shi, is a rocky islet, on the southern side of which are white rocks, which from a distance resemble houses and serves to point out the locality.

The high land on the north may be easily recognised when coming from the northward or southward, in following the coast of which it forms the most salient point. Outside the port the water changes its colour, but there is no bottom in 38 fathoms at 2 miles from the shore. After rounding Kuriyado saki at 2 cables distance keep nearly in mid-channel, steering S.W. by W., passing the reef to the south of Miojin saki at about 2 cables to avoid a rocky ledge which extends three-quarters of a cable from it in a S.S.W. direction.

After rounding Miojin saki haul up West, and passing a quarter of a mile north of Oo sima, the larger and higher (190 feet) of the two wooded islands, anchor off the centre of the town of Yamada in 6 fathoms.

When standing in for the anchorage the water shoals to 7 fathoms, and then deepens to 10, after which it decreases gradually. The eastern part of the bay is deep, rocky, and exposed, therefore not recommended as an anchorage.

Supplies.—Only a very limited supply of eggs and poultry can be obtained here, and fish are scarce. The inhabitants subsist chiefly on the edible seaweed procured from the rocks around the harbour, quantities of which is dried for export. The water from the rivulets pass through the rice fields, and is not pure.

Weather.—During August the sea breeze blew every afternoon, bringing in the evening clouds of fog from seaward, which remained hanging over the mountains until sunset. During the night the fog descended in a heavy dew.

Tides.—It is high water, full and change, in Yamada harbour at 6h. 30m.; springs rise 4 feet.

MIYAKO BAY,[*] situated 8 miles north of Yamada, is about 5 miles deep, with depths varying from 40 fathoms at the entrance to 5 fathoms at one mile from the sandy beach at the head of the bay. An island (Hinode sima) lies 3 cables off the shore on the west side of entrance, one mile south of which is a peninsula that, projecting from the western shore, protects the anchorage off Miyako town and river, immediately south of it; junks anchor in 7 to 4 fathoms, mud. The inlet is open to the north-eastward.

About the time of the equinoxes, strong N.E. winds occasionally blow, and in the winter strong westerly winds.

Tides.—It is high water at full and change at Miyako at 3h. 35m.; springs rise 3¾ feet (irregular).

The COAST north of Miyako takes a N.N.E. direction, and is a shelving table land, bordered by broken cliff and backed by high flat ranges, which rise to about 2,000 feet; but the land gradually decreases in elevation towards the north until about Sanemuva point, where it becomes low.

Kuro saki stands well out, and may be recognised by its small range of hills about 700 feet high; north of Kuro saki the cliffs get lower, and the long flat slopes run out into fine tapering points.

Two isolated mountains can be seen behind Hon-na-mi. The land is densely wooded.

CAPE DE VRIES is low and flat, about 330 feet high, and is remarkable from the way it stands out between two bays. The *Dupleix* sailed along this coast from cape Kiori to cape Vries, at a distance of from two to four miles, and saw no danger except close to the shore.

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[*] *See* Admiralty plan:—Miyako bay, on sheet No. 210; scale, *m* = 1·5 inches.

Siriya saki anchorage.[*]—At 2 miles south of Siriya saki, is an anchorage which would be useful to vessels bound west through Tsugar strait during the winter season, and obliged to anchor. The lead is a safe guide, and the bottom at 23 fathoms is fine black volcanic sand, gradually changing to coarse brown, with a few shells: but at a depth of 3 fathoms and less, the bottom is stony. From a vessel at anchor in 7 to 9 fathoms the light at Siriya saki is visible. A small vessel might anchor in 4 or 5 fathoms with good shelter.

Tides.—The rise and fall of tide appears to be about 3 feet.

SIRIYA SAKI.[†]—The north-east extremity of the island of Nipon is a narrow point trending in a N.N.E. direction, and the land for about a mile south of the extreme point is low and flat; it then gradually rises to a prominent hill with a double summit called Siriya yama (Whaleback), the highest part 1,321 feet, is about 2¾ miles S.S.W. of the point.

LIGHT.—A *fixed* white light of the second order, elevated 150 feet above the sea, visible from seaward between the bearings of N. ½ E., (through west and south) and N.E. by E. (over an arc of 311°) is exhibited from a white circular tower 94 feet in height, situated on Siriya saki; and should be seen in clear weather from a distance of 18 miles.

Fog signal.—A steam siren will give a blast of *six seconds* duration at intervals of *one minute* during thick or foggy weather. Should the machinery of the siren be out of order, a bell will be rung from the balcony of the lighthouse, continuously (by machinery) at the rate of 15 strokes per minute.

Rock.—Three cables N.N.E. of the point is a conspicuous rock, 60 feet high; there is no passage between it and the point. The coast for about 4 miles south of the point on the eastern side is rocky, and in the neighbourhood of Siriya yama precipitous, south of which a sandy beach extends for many miles.

Rattler rock, awash at low water spring tides, lies 8½ cables E.N.E. of Siriya saki lighthouse.[‡]

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[*] *See* Admiralty plan:—Siriya saki anchorage, on sheet No. 208.

[†] Information relating to the eastern portion of Tsugar strait, as also to the west coast of Yezo and off-lying islands, has been furnished by Lieutenant R. F. Hoskyn, H.M. surveying vessel *Flying Fish*, 1881–2.

[‡] A rock was reported by H.M.S. *Charybdis* in August 1879, as having been seen 2 miles E. by N. of Siriya saki lighthouse. In this neighbourhood depths of 31 to 32 fathoms were found by H.M.S. *Flying Fish*, the position being examined many times and also watched from the top of the lighthouse on a calm day, while a swell was running from the E.S.E. that broke in 5 fathoms; but no danger outside the Rattler rock was seen, nor was it known to the light-keeper at Siriya saki, or to the fishermen who frequent this part of the coast.

Ledge.—A narrow ledge of less than 20 fathoms extends in a N.N.E. direction for about 3 miles from Siriya saki; the water deepens rapidly on the eastern side, but on the north and west sides the descent is more gradual. This ledge is usually covered with tide rips and overfalls, which at times are heavy.

The COAST, from Siriya saki, trends in a S.W. direction, and for about 3½ miles to Ūiya mura, is foul and rocky. At 1½ miles from Siriya saki point is Observatory island, a rocky islet one cable from the shore and 80 feet high.

Anchorage.—Temporary anchorage may be obtained on either side of Siriya saki; but under any circumstances it is a most exposed place, and if it is necessary to anchor, great caution should be used. H.M.S. *Flying Fish* was frequently anchored about half a mile W.S.W. of the lighthouse, in 12 fathoms, but the position cannot be recommended. The bottom is composed of sand, large stones, and rocks.

Probably, if compelled to anchor, it would be more advisable on the eastern side, to anchor off the sandy beach south of Siriya yama (*Whale-back*), where the water shoals gradually and no dangers are known to exist, but caution is necessary, as this neighbourhood has not been thoroughly sounded. On the western side good shelter may be found from all winds except those from West, through North to N.E. off Ūiya mura, in 7 or 8 fathoms sand.

Soundings.—The 100-fathom line of soundings passes 5 miles south-east of No sima point, 4 miles south-west of Kitsu ura, thence into the bay from which it takes an easterly direction, passing 7 miles south and 15 miles east of Iwa-wada, thence gradually in a north-east direction and passing 15 miles east of Inu-bo-ye saki. The 50-fathom line of soundings lies midway between the 100-fathom line and the coast.

Directions.—E. Coast of Nipon.—Vessels bound from the gulf of Yedo to the eastern entrance to Tsugar strait will, after passing Mela head, experience the full force of the Japan stream setting to the E.N.E. Having passed Mela ledge with Tree Saddle hill open of Su no saki (*see* page 317), steer E. by S. 8 or 9 miles to clear the shoals extending off shore at 1⅓ miles E.S.E. from No sima point light, when a course may be shaped along the coast at a distance of 1½ or 2 miles as far as Iwa-wada, which may be rounded at that distance, and thence N.E. ¼ E. for Inu-bo-ye saki, passing over the bank of soundings that extends from the open bay between these points. As Inu-bo-ye saki is approached from the south-west the depths will decrease, when do not shoal to less than 10 fathoms, and pass the point at 1½ or 2 miles distant. By keeping farther off shore, however, when proceeding northward, the Japan stream will be more felt, and a more rapid passage ensured. After passing Inu-bo-ye saki shape a course to pass at not less than 3 miles; north of this cape the Kuro-Siwo is scarcely perceptible. During thick weather the bank of soundings north east of Iwa-wada forms a useful guide to vessels approaching this part of the coast from the eastward and bound southward. If, after passing Inubo-ye saki at a distance of 2 or 3 miles, a S.W. ½ W. course be steered, depths of 20 fathoms will be obtained for about 35 miles, when the depth will suddenly shoal to 11 fathoms, which will indicate the proximity to Ohigasi saki; thence steer South until a depth of 60 fathoms or more be obtained, when S.W. by W. ½ W. may be steered for No sima point· Bound southward during the summer months, when the Kuro Siwo sets strong to the E.N.E., it will be advantageous to keep as near the coast as safety will permit. The bottom on the bank of soundings eastward of cape Erratasti is composed of black sand, while that eastward of Iwa-wada is of a varied formation. Should a vessel's position be uncertain a S.S.W. course from a depth of 60 fathoms will lead clear of all danger.

Current.—It will be remembered that the Oya Siwo flows to the southward along the north-east coast as far south as Inuboye saki (*see* page 40), and that its average width is from 100 to 200 miles, outside of which the Kuro Siwo flows to the north-eastward.

On nearing the entrance of Tsugar strait a sudden fall may be experienced in the temperature of the sea of from 15° to 20°, as the vessel passes from the north-easterly current (Kuro siwo) into the cold current setting to the southward.

This coast is known to be subject in spring to strong gales and much heavy weather, the only known harbours of refuge being Kama-ishi, Odzutsu, Yamada harbour, and some of the inlets in Sendai bay.

CHAPTER VI.

THE SETO UCHI, OR INLAND SEA, AND ITS APPROACHES.

VARIATION in 1884 : 4° 15′ W.

THE EASTERN ENTRANCES TO THE INLAND SEA.

The BOUNGO CHANNEL,[*] the western of the two entrances to the Seto Uchi, on the east coast of Japan, is safe to navigate as far as it is at present known,[†] the projecting points and islands being found correctly marked on the Admiralty chart by the allied squadron under the command of Vice-Admiral Sir A. L. Kuper, K.C.B., which entered the Seto Uchi by it in Sept. 1864. The western points of the different islands and capes on the eastern shore, from Okino sima on the south to Mi saki on the north, are well defined, and apparently steep-to; as is also the land on the western shore along the north-east coast of Kiusiu. As the coast on either side, however, has not yet been closely examined, it would be prudent to approach it with caution.

OKINO SIMA, a large island forming the eastern point of the south entrance to this channel, attains an elevation of 1,150 feet, and may be seen in clear weather from a distance of 35 miles; its south-west point appeared to be steep-to. To the northward of it, also towards Hime sima and towards the main land to the eastward, the space appeared to be rocky foul ground.

Midzu-no-ko (Child of the sea) **or Euryalus rock,** so named after H.M.S. *Euryalus*, is a small rocky islet 60 feet high, lying in the middle of the Boungo channel, 25 miles north-west of Okino sima. It is surrounded by rocky shoals, some above water, to the distance of half a mile. There is said to be a spring of fresh water on this islet.

Soundings in 35 fathoms, sand, were obtained on the parallel of Moko sima, two small islands lying 12 miles N.W. of Euryalus rock.

TAKA SIMA, the island lying nearly in the middle of the northern entrance to the Boungo channel, has two small rocks above water at 2 cables

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[*] *See* Admiralty chart :—Seto Uchi or Inland sea, No. 2,875; scale, $m = 0{\cdot}25$ of an inch.

[†] The shores of the Boungo channel as shown on the chart is from the Japanese manuscript, this coast as yet not having been minutely examined. The remarks are by Mr. George Williams, Master H.M.S. *Euryalus*, September 1864.

N.E. of it, and sunken rocks and reefs extend nearly half a mile from its shores in several places. The passage on the west side of this island, between it and Sagano saki, on the mainland of Kiusiu (*see* page 429), is encumbered with reefs, but the eastern passage between the island and Mi saki (the north-western point of the mainland of Sikok) is free from danger.

Mi saki, the narrow sharp point terminating the remarkable peninsula which forms the south-western point of Sikok, is 150 feet high, and has off it two small islets. The land gradually rises from it until at a distance of 20 miles to the eastward there are mountain ranges attaining in some parts an altitude of 2,000 feet. The summits are generally bare, but some are wooded, and the slopes are cultivated.

Directions.—Passing from the Inland sea into the Boungo channel a mid-channel course between Mi saki and Taka sima should be adopted. At the strength of spring tides during the flood stream, which makes to the northward through the Boungo channel, a heavy tide race forms off Mi saki, sometimes extending across the entrance towards Taka sima as far as 2 miles. During spring tides the stream often sets through this entrance with great velocity (6 knots) and on the flood an eddy has been found on the Taka sima side of the channel. Overfalls also are met with extending three-quarters of a mile from Taka sima.

The KII CHANNEL, the eastern and most frequented of the two channels into the Seto Uchi, on the east coast of Japan, lies between Sikok and Nipon, and is 80 miles across at its entrance from the Pacific, decreasing to 15 miles at 30 or 40 miles within, which width it preserves for 20 miles farther, to Awadji sima. The coast of Awa to the west from Muroto saki to Naruto is as yet unknown; but the coast of Kii from Oö sima to Kata, along which vessels pass to and from the Seto Uchi and Yokohama, has been surveyed or explored. The fairway from the Kii channel into the Seto Uchi is by Isumi strait, but there is a more direct route, by taking which (if not bound to Osaka or Hiogo) a saving of 35 miles is effected, viz., the Naruto passage, west of Awadji, but this channel should not be attempted excepting under the most favourable circumstances, that is, at slack water or within half an hour of it, and at neap tides, and even then it is highly dangerous (*see* page 344). The coast on the western side of the Kii channel from Muroto saki to the rocky point Ō-iso at the western entrance to the Naruto passage as shown on the chart is from the Japanese manuscript.

Winds.—The wind follows the general direction of the coast in a very remarkable manner, blowing down the large gulfs from the northward and becoming either east or west on the south and east coasts. In the Kii and

Boungo channels the wind will be frequently found strong from the north when it is light on the coast in the neighbourhood of Oö sima from east or west. (See page 20.)

MUROTO SAKI is a steep headland 400 feet high, and when first seen from the eastward or westward (in clear weather) appears as an island. Another hill, 770 feet high, 2 miles to the northward, also appears as an island, but it may be distinguished from Muroto saki from its being sparsely wooded.

I SIMA lies nearly in the centre of the western shore of the Kii channel at its narrowest part; its southern peak is visible 30 miles.

The channel between I sima and Kamoda saki (the eastern point of Sikok) is 3 miles broad; in it are several detached groups of rocks, which do not cover at high water, and amongst them (according to the description of the fishermen who act as pilots) are sunken rocks, over which not more than 24 feet can be carried in any of the channels, excepting the westernmost, which the fishermen state to be clear of danger and navigable.

This clear channel lies between Misaki (the south-eastern point of Kamoda saki) and the westernmost group of seven low rocks. By rounding the outlying rocks off Misaki at 1½ cables distance, a depth of not less than 7 fathoms may be carried through. H.M.S. *Serpent* passed through this channel.

Between the reefs the depths are irregular, varying from 7 to 35 fathoms.

The I sima group may be approached on all sides except the west, to within a distance of a mile.

Caution. — The channels between the reefs westward of I sima should not be attempted.

WADA SIMA.[*]—This harbour, in lat. 34° 0′ N., long. 134° 39′ E., affords a good anchorage in from 4 to 6 fathoms water, just inside a low point with trees on it, on the east side of the harbour.[†]

A patch of rocks, which in some places show about 2 feet above low water, lies N. by E. 1½ miles from the low point; the sea breaks heavily on them when there is any wind or swell, but in calm weather they are dangerous. There are 10 fathoms, mud, close to.

Making the harbour from the eastward, steer in about West for the low point, and round it at a distance of about half a mile; there is deep water close to the point.

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[*] *See* Admiralty plan:—Wada sima harbour, on sheet of plans No. 357; scale, $m=2$ inches.

[†] Navigating Lieutenant F. A. Johnstone, H.M.S. *Salamis*.

The south and west parts of the harbour are very shoal, the harbour banks being here walled in. On the west side there is a conspicuous bluff wooded point, with some large rocks extending off, round which, to the northward, is a landing place; inside the bluff is a small fort built to carry four guns, two to command the entrance to Tatsiye and two to command the landing place, but none appeared to be mounted. The hills inland are high.

The coast from Wada sima takes a northerly direction for 10 miles, several deep inlets, channels, and rivers being delineated on the Japanese manuscript.

SIKOK-NO-AWA.—The north-east coast of Sikok is in the province of Awa, and has high hills, with tufts of trees at their summits, sloping down to wooded spurs near the coast. The islands of this coast form the western shore of the Naruto channel.

Ō-iso, the projecting sandy point north-east of Sikok, slopes down from a hill named Shiro-muné yama, 290 feet high, ending in a bare conical mound. This hill makes triple generally, the mound and eastern summit being covered with grass, while the western and highest is wooded. The whole shore is fringed with boulders, some of them covered at high water. East, 3 cables from Ō-iso, are some rocks awash, with deep water on cable outside them.

From this point, south, the coast is flat and sandy, fronting a large plain, on the southern edge of which stands Toku sima (the capital town of the province of Awa in the island of Sikok), on the banks of a river one of whose mouths flows into the Muya-no seto (from which it takes the name Muya-no kawa) just within the southern entrance. The largest branch of this river, after having passed through a lagoon (Hiro umi) close to the coast, flows into the Kii channel, by the Hiro-do, a few miles south of Ō-iso.

From Ō-iso to the southward, the water is shallow; a depth of only 10 fathoms being found at 4 miles east of the shore, a mile south of Ō-iso; caused probably by the sand brought down by the Hiroto kawa—a considerable stream that drains the east of Sikok.

MUYA-NO SETO, is a narrow passage, with a general width of one cable, separating Sikok from the islands Oge sima and Simada sima.

At its southern entrance, rocks extend from the north shore, leaving a passage of only half a cable between them and the sandy beach under Shiro-muné yama on the Sikok shore. These dangers, with the strength of the tides (4 to 6 knots), prevent the passage being practicable for any vessel larger than a junk, most of whom take it in preference to the Naruto, and many frequent it, carrying away cargoes of salt, manufactured in large quantities on its banks.

At the north entrance stands the village of Kita-tomari (on the Sikok shore), off which a spit of shingle extends half a cable, and shoal water stretches a short distance off the eastern shore.

OGE SIMA.—The north shore of this island has alternately shingly beaches and bluffs, the latter being the termination of spurs from inland summits, all densely wooded, the highest of this portion, Hori-koshi no taka, 518 feet, being surmounted by a single tree. Its eastern shore forms the western side of the southern approach to the Naruto passage, and consists of long sandy beaches, between points formed of pinnacle islets, and black sharp rocks. The most conspicuous is a peninsula, wooded at the summit, and cliffy on its sea face, lying S.W. by S., nearly one mile from Hadaka sima. The coast should not be approached south of this peninsula nearer than half a mile as the depths decrease suddenly. The summit of this island is a conical, flat topped, wooded hill, Kuro yama, 599 feet high.

NARUTO PASSAGE.*—The Naruto (literally, gate of the sea which makes a great roaring) has hitherto been considered to be a whirlpool, and it is not without cause that this dangerous character has been attributed to it, for junks have foundered in its turbulent waves, or been dashed to pieces on its rocks by the impetuosity of the current. This channel lying between Tō saki (the projecting south-west promontory of Awadji sima), and Mago saki (the north point of Oge sima), is only 7¼ cables wide from point to point, and is further narrowed to 3 cables by an extensive reef of rocks off Tō saki, and some reefs and islands off Mago saki.

Through this narrow passage the tide runs, or rather falls, with a velocity of 7 to 8 knots at within 1 hour to 1½ hours before or after the change of stream, which occurs about every six hours, there being little or no slack water. The junks choose the early and latter parts of the tide, when fair, to pass, but never attempt it when the wind is so strong as to require reduced canvas, for then the sea is so heavy that vessels become unmanageable.

TŌ SAKI, a long narrow promontory, forms the eastern side of Naruto, and has a clump of trees near its extreme.

Nagase.—Off Tō saki, separated by a channel of 1¼ cables that breaks entirely across at spring tides, lies Nagase, a rock about 2 feet above high water, surrounded by others that cover; the southernmost, lying 1¼ cables from it. The channel here is only 2½ cables wide. The sea breaks on all these rocks during the strength of the tide.

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* *See* Admiralty plan :—The Naruto passage, No. 119, scale $m=2\cdot0$ inches.

MAGO SAKI, the north-east point of Oge sima and western point of the Naruto passage, is the extreme of a bluff wooded peninsula, whose western extreme of shingle forms a bay, Kame ya, in which boats may find shelter. A short distance west of Mago saki, on the north shore, is a granite quarry on the side of the hill.

Hadaka sima, a small islet, lying S.S.E. ¾ E. 2 cables from Mago saki, has a double summit, the western, 62 feet high, being wooded, and the eastern, 47 feet high, being bare; it is joined to Oge sima by a chain of rocks that cover at half tide. Off its eastern extreme, three rocks, that cover only at highest spring tides, terminate in rocks having 10 feet on them, the outer being one cable from the island.

Tobi sima, 93 feet high, is a conical wooded islet, lying S.S.E. 3½ cables from Hadaka sima. It has shoal water off its north end for 1½ cables, but may be approached on the eastern side to one cable. A rock, one cable in extent east and west, with 4 to 5 fathoms on it, and steep-to, lies S.W. 4 cables from Tobi sima.

Uchi umi.—Hori koshi, is the narrow eastern entrance to Uchi umi, a large expanse of deep water, almost entirely enclosed by the shores of Ogé simà and Simada sima, on the west side of the Naruto passage, and communicating with another narrow strait, the Muya-no-seto, which communicates with the Kii channel and Inland sea. Boats only can pass through, within an hour of slack water. Off this passage (Hori koshi) there is shoal water for 3 cables, having 2¾ fathoms on the outer edge; but the rush of tide prevents its being available as an anchorage.

SIMADA SIMA, immediately north-west of Oge sima, has a double range of wooded hills, between which two valleys nearly meet. Its highest hill, Kane-kake-matsu, on the north-east side of the island, is 543 feet high, and is surmounted by a conspicuous tuft of trees.

Se-no-kata-bana, the north point of Simada, is steep, having boulders and shoal water extending one cable from it. There is a very strong tide rip off it at spring tides, and it should not be approached within 3 cables, as the bottom is irregular. From this to Hori koshi, shingly beaches and cliffy points alternate, round the bays of Ta-no ura.

HI URA, a bay about 4 miles to the westward of the Naruto channel, is 5 cables deep, 2¾ cables wide, and has good anchorage for a small vessel in 3 fathoms, mud bottom. Shoal water lies half a cable off the western point of its entrance, and the eastern shore should not be approached within that distance. Large vessels can anchor outside in 11 to 13 fathoms, 3 cables from the shore. To the eastward the shore is tolerably steep, densely wooded, sloping to a shingly beach fringed by boulders that cover at high water, and it may be approached to within one cable.

AWADJI SIMA.—The south-west coast of this island forms the eastern shore of the Naruto channel. From Tō saki the long narrow promontory before mentioned, the coast of Awadji on the south side of the channel takes an easterly direction for about 2 miles to Tsuru sima saki at the entrace to Fuk ura.

Ōsono sima, a wooded island 101 feet high, lying in the bight between Tō saki and Fuk ura, is almost connected to the mainland by a spit of large stones and shingle, and has rocks lying one cable south of the south point; the outer just covers at high water, is steep-to, and resembles a boat.

Tsuru sima saki, the north point of the entrance to Fuk ura, is the termination of a grass covered bluff surmounted by three trees, and has rocks stretching from it S.W. nearly one cable, that cover at high water, and are steep-to on the southern side. Kane-kake-matsu, in line with the outer high rock off Tō saki, bearing W. by N., clears both this and the reef off Osono.

FUK URA, a fine bay, having excellent anchorage just within the entrance in 7 fathoms, mud bottom, good holding ground, contains two islands, Keburi sima, conical and densely wooded; and Susaki, flat and covered with a dwarf oak. From the latter, a spit having 6 feet on it continues from the boulders that dry to a shingly tongue, that shelters the entrance of Cha-no-ire, a shallow bight much used by junks in want of repairs. Within this spit the water is deep; but this bar, and the want of width in the channels between the islands, prevents any vessel larger than a gunboat from taking advantage of its shelter.

A high range, whose summit is 913 feet above the sea, intersected with numerous valleys, slopes down to the northern shore; the eastern end being a bare granitic hill, Nambeiji, having on it a remarkable clump of trees 58 feet high, their base being 937 feet above high water. The southern shore has shingly beaches, the base of the gentle slopes of a wooded range, the highest summit of which, 501 feet high, is on the south end of Cha-no-ire.

Ko-ura saki, is the steep bluff at the south entrance of Fuk ura, the western termination of Taziri yama, a double summit, both of which are 418 feet high, and surmounted by a tuft of trees. From this to the southward the coast falls suddenly to the sandy beach of Hama-no hama, fronting an extensive cultivated plain. In the middle of this beach stands an isolated hill, about 200 feet high, topped by a single tree, and sloping down to the beach in three points. The bay off this is shallow, the outer edge of 4 fathoms lying S.S.E. $\frac{1}{4}$ E. $1\frac{1}{3}$ miles from Ko-ura saki.

SHIWO SAKI, the south-west point of Awadji sima, slopes from a wooded hill, 516 feet high, named Gongen yama, and terminates in a conical grass mound 167 feet above the sea. From it shoal water, having 5 fathoms on the outer edge, stretches west half a mile and south a quarter of a mile. The lead will give sufficient warning on approaching it.

The south coast of Awadji sima is bold, having steep slopes from wooded hills, with deep ravines, falling abruptly to the sea, and with several villages scattered about the slopes. No danger is known to exist beyond a quarter of a mile from the shore.

Soundings, northward of the Naruto channel range from 20 to 13 fathoms, sand and shells, except in the run of the tide, where the water deepens suddenly into a gully, having as much as 65 fathoms.

Directions.*—The Naruto passage should not be used except in a case of necessity. On passing through the Naruto channel with the tide from the north, Mago saki should be approached to 1½ cables, and from that a course steered in the smooth water, rather nearer Hadaka sima than Nagase, and from mid-channel to 1½ cables from Tobi sima.

On taking the channel with the tide, from the southward, Tobi sima should be closed to 1½ cables, and an opposite course steered.

The passage may be taken at the first and second hour before and after change of stream, with the tide, and for the first three quarters of an hour before or after change, against the tide, in fine weather; but in bad weather it should not be attempted, as the sea then breaks right across the passage, and it is difficult to distinguish the channel.

Vessels must be careful to have the passage well open before approaching it, and at all times great caution must be observed as the heavy whirls and eddies cause its navigation to be always attended with risk.

Tides.—The tide sweeps through Naruto in about a N. by W. and S. by E. direction, with a velocity at springs of 10 to 11 knots, but slacking about an hour before and after change, either way, to 7 to 8 knots. The roar of the tide can, during spring tides, be heard for many miles.

At springs there is scarcely any slack water, but at neaps there is about a quarter of an hour.

The change of stream after the northerly tide follows the moon's meridian passage at place by intervals ranging from 3h. 25m. at springs to 2h. 8m. at neaps, running on an average 6h. 25m. each way.

With the northerly tide (said by the natives to be a knot stronger than the southerly set) the race extends as far north as Anaga, and breaks with great force, but has no danger for a decked vessel. On either side of the race on this tide the stream sets to the southward, but has scarcely any strength. On the south side of Naruto it takes the line of the shore converging to the channel as it gets near.

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* The description and directions for the Naruto passage are by Lieutenant C. J. Bullock, 1859, and Navigating Lieutenant W. F. Maxwell, 1869.

With the southerly tide the race expends itself in whirls about the parallel of Kuro yama, and on either side of it the tides are very variable, though generally close to its margin there are eddies sweeping to the northward.

On the north side of Naruto, on this tide, the stream rushes with great velocity round Se-no-kata bana and Sozu-no hana in the direction of Mago saki, but there is only a slight stream on the eastern shore, till quite close to the Naruto passage. The Kii channel, south of Naruto, also shows clearly the run of the tide, 80 fathoms having been obtained about a mile south of Tobi sima.

It is high water, full and change, at Fuk ura at 6h. 17m., springs rise 7 feet, neaps (probably) 4½ feet. The north-western stream makes at 2¼ hours before high water at Fuk ura, changing every 6 hours nearly. North of the Naruto passage the tides are anomalous; west of Mago saki in the daytime it was high water, when it was low at Fuk ura; and at Anaga ura in the evening it remained at high water level during the whole of the ebb at Fuk ura, and fell to low water at Anaga ura as it rose to high water at Fuk ura, the rise and fall being only 4 feet above the Naruto; so that at the strength of each stream there must have been a difference of level of 3 to 4 feet on either side. The current set out S.S.E. ½ E.

On approaching from the south with the tide, it appeared to have no great strength until nearing the rocks, through which it sweeps in calm weather in a perfectly smooth stream. At one mile above them on the ingoing tide, it exceeds 7 knots.

The tide race commences at 2 cables beyond the reefs, where the converging currents meet, forming whirls and eddies for a mile; some of these had a depression of 3 feet, and some junks were turned round and round many times, but they would not much affect the steering of a steamer with attention to the helm. There are strong counter currents on either side of the race, where fishermen lie in the smallest boats, guiding them through the passage with great skill.

Anchorage.—If wishing to wait for slack water, or change of stream, anchorage may be found on the Awadji shore, at Maru yama on the north side of the Naruto; and at Fuk ura on the south, in 4 to 8 fathoms. There is also excellent anchorage in Hi ura (Minotoye bay), 5 miles to the westward.

In the bay west of Mago saki the anchorage is bad; and there are extensive reefs off the Sikok shore south of Tobi sima.

The SOUTH COAST of AWADJI SIMA, from Shiwo saki, takes an east-north-east direction 12½ miles to Kama saki at the entrance to Isumi strait; it is clear of danger within a mile, and the shore is bold and mountainous, the hills being well wooded.

NOMA SIMA, lying 1¾ miles from the south-east coast of Awadji, is formed of some very flat-topped hills from 100 to 200 feet high, bordered with low cliffs. It has reefs a cable off its south point, and there is a bay and village on its west side.

YURA HARBOUR.*—Yura is a town in a curiously sheltered harbour on the south-east side of Awadji, and forms the western shore of Isumi strait. A low island, 1½ miles in length, of sand and shingle and covered with scrub, with a bluff hill 126 feet high on its north point, and a large granite fort on its south, lies like a breakwater fronting a bay, and forms the harbour which has narrow entrances north and south; a little north of the fort where the island is stony, it covers at high water, but a boat can scarcely pass over it.

Sin kawa guchi.—The north entrance has depths of from 10 to 11 feet at low water springs, and is 120 yards wide; the south entrance (Ima gawa guchi) is a narrow opening with only 2 to 3 feet water in it. The broadest part of the harbour is half a mile, with anchorage in 4 to 5 fathoms, mud bottom. A vessel drawing 16 feet could enter at high water springs, and lie secure in smooth water for repair. The junks anchor somewhere to the northward of this to wait for tide.

Anchorage may also be obtained in 2 to 5 fathoms outside the island on the sand-bank off it, with the outer extreme of the bluff bearing N.W., or of the fort S.S.W.; but it is very steep on the edge, and the holding ground is probably not good.

Tides.—It is high water, full and change, in Yura harbour at 6h. 5 m.; springs rise 6½ feet.

KATA is a town on the eastern side of Isumi strait, on the south side of a bay north of Takura saki, where there is anchorage in 5 to 8 fathoms. There is a fine landing pier here 200 yards long. Off Takura saki, and in Kata bay as far as Diyi island, reefs covering at high water, extend about 3 cables off the shore. (For Isumi strait *see* page 361.)

Tides.—It is high water, full and change, at Kata at 6h. 5m.; springs rise 6½ feet; neaps, 4½ feet.

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* *See* Admiralty plan :—Yura harbour on sheet, No. 357; scale, $m = 5 \cdot 0$ inches.

TAKURA SAKI, the eastern point of entrance to Isumi strait, is a wooded headland, the extremity of a mountainous promontory. It is skirted with reefs extending 2 or 3 cables west and south of it. On the north and west the country is high, but the coast south of it is low and wooded for 5 miles as far as Zoga saki, a rocky point with four small islands off it which are steep-to.

Hachken gawa,* is a small river flowing through a plain 5 miles south-east of Kata. Waka yama, a small isolated wooded hill 66 feet high, is on its left bank 1½ miles from the entrance; on its summit stands the residence of the Prince of Kiisiu, conspicuous from the sea. There is only a depth of 3 feet on the bar, which is one cable wide, and the passage over it is marked by six large posts; inside the entrance there are 9 to 12 feet at low water. A detached shoal of 11 feet water, lies S.W. by W. 3 cables off the bar. There are forts on both sides of the river.

South of Zoga saki is a bay 4 miles deep, and 3 across its entrance, in which anchorage may be found in 4 to 10 fathoms. There are no dangers more than 1½ cables from the shore, that are known. The southern shores are high, steep, and bold-to, the northern sandy between two ranges, where a small stream disembogues; two hills, one 410 feet high over Zoga saki, and the other, Kamidera, 710 feet high, over the plain to the east, are very conspicuous.

OSAKI BAY,† is an inlet 1½ miles deep, and open to the W.N.W. The village of Osaki stands on the shore of a small bay on its north side, where small vessels can find good shelter in 5 to 2 fathoms, which they can also obtain in Smotz ura, the innermost bay on the south side of the inlet. The only danger is a rocky patch of one fathom lying one cable S.E. of the north entrance head. The south point of Tree islet (off Osaki village) should be given a berth of more than one cable. Over the village of Osaki is Takadoösi yama 591 feet high, a smooth-topped hill with two stunted trees on its summit, conspicuous from off shore. The south shore is hilly, the south entrance bluff, being about 400 feet high. Fresh water and small supplies can be readily obtained.

Okino sima, W. by S. ½ S., 2 miles from the entrance of Osaki, has a round hill 271 feet high, and is bare of trees; it may be passed at 2 cables, it having some rocks awash on the south.

Djino sima, one mile east of Okino sima, is 400 feet high, has high cliffs towards the sea, and is wooded; it may not be passed inside, nor within 2 cables on the west side. A rock awash lies about 2 cables south of it, and two rocky islets about a mile south, the northern of which has a grassy top; these are close off the low shore. A third islet lies half a mile N.E. of them.

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* *See* Admiralty plan:—Hachken river, on sheet No. 357; scale, $m = 7 \cdot 0$ inches.

† *See* Admiralty plan:—Osaki bay, on sheet No. 357; scale, $m = 3 \cdot 0$ inches.

Tides.—It is high water, full and change, at Osaki bay at 5h. 55m.; springs rise 6½ feet.

MIYA SAKI, 2 miles south of Okino sima, is an abrupt wooded peninsula 220 feet high at the extremity of a range of small hills of 150 to 200 feet elevation, on which are seen two conspicuous trees. On its north side, the Arita, a small stream, disembogues, having flowed through the highly cultivated plain at the foot of the hills. It is navigable by small junks for a short distance up. To the eastward, the ranges rise in succession to elevations of 1,000 and 2,000 feet. Miya saki may be passed at a distance of 3 cables.

TSKAHARA BAY, is 5 miles deep and 6 miles across, between Miya saki and Sirasai saki, its north and south points of entrance. Its sides converge somewhat regularly to its head, where there is the bay of Hirowatali, about three-quarters of a mile in length and breadth, with anchorage in 7 to 8 fathoms, mud, and well sheltered from all winds except those from W. by S. A pier at the south end of the sandy beach at its head and off a small town, protects small craft in a shallow inner harbour.

Kura sima and Taka sima lie off the southern shore of Tskahara bay, Kura sima the outer is high, even topped, cliffy and very bold-to, with some islets close off its south-west point, and a run of deep water inside it; Taka sima is undulating, with a conspicuous round hill on its western part, bordered by cliffs. It is 4 cables west of a hilly promontory, on one of the peaks of the outer high double summit of which, is a beacon. Both these islands may be passed at 2 cables, except the south point of Taka sima, off which at nearly that distance there is a rock awash.

The Karamo group of small islands with reefs about their north sides, lie N.N.E. of Taka sima and west of Hirowatali bay, with a cluster of rocks E.N.E. of them half way to the shore, the ground about which has not been examined.*

Golden rock, so named from the large amount of property lost there, is a very small patch, nearly awash at low water, and so steep that the lead gives but little warning, there being 17 fathoms at 100 yards on the outside. It lies 3 miles N.N.E. ¼ E. of Shirasai saki, N.W. ½ W. 1⅓ miles of Taka sima hill, and S. by E. ⅔ E. of Miya saki.

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* The coast of the Kii channel from Tanabe to Isumi strait, and the south shore of Awadji, were surveyed by Lieut. C. Bullock and James Kerr, Master R.N., in H.M.S. *Dove.*

Sung-ami, three-quarters of a mile North of the west point of Karamo, is a sunken rock with 6 feet water over it and equally steep-to; it is also 1½ miles N. by E. of Taka sima and S.E. ½ E. 2⅓ miles from the point south-east of Miya saki.

Directions.—Unless desiring anchorage or working to windward against tide, Tskahara bay should not be entered within a line joining its points, as the two dangerous rocks above mentioned lie in the centre and northern parts of the bay.

Entering Tskahara bay, Taka sima should be steered for, except on a bearing between S.E. by S. and E.S.E., and when Shirasai saki is shut in behind Kura sima, stand in for Hirowatali bay passing south of the Karamo group; this mark will lead clear to the eastward of the Golden rock. If working to windward, take care to tack before the western point of Kura sima bears south; if in the vicinity of the rock, this is the best mark to clear it on the outside.

SHIRASAI SAKI or White rock point, derives its name from the large masses of quartz in its cliffs, and which, with the white pinnacle rock 200 feet high 4 cables E.S.E. of it, show very distinctly from the south. The point is not high, but has an abrupt cliff with deep water at its base, and is the end of a range of well defined hills which rise in succession for 1½ miles east to a rock-topped summit, 826 feet high. To the northward is a small bay, the northern point of which is formed by an island, with a large tree on its summit, but which never appears detached. A large round rock lies one cable N.W. of Shirasai saki. Turtle were seen here.

Fisherman rock, a small narrow rock 4 feet above high water and steep-to on the outside, lies 4 cables West of Shirasai saki. Some rocks awash extend a cable's length to the N.E. of it. The passage inside the rock carries 14 fathoms in mid-channel.

OÖBIKI URA, is a bay between Shirasai saki and Yura no uchi, where a vessel might anchor for the night with the wind off shore, in 6 fathoms at 2 or 3 cables from the beach. The steep little island Hijiki sima 120 feet high, off its south point, marks the north point of entrance to Yura no uchi, a wooded hill with a craggy rock on its summit; a large rock lies at the extremity of its low-water reefs.

YURA NO UCHI* is a harbour 4 to 7 cables in breadth and 2 miles deep, and being sheltered by the sharp peaked island Ali sima and the extensive reefs off the south point of entrance, always above water, is only open between W. by S. and S.W. by W. Winds from these directions cause some swell inside in a gale, but it is nevertheless a secure anchorage.

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* *See* Admiralty plan:—Yura no Uchi, on sheet No. 357; scale, *m* = 2·25 inches.

The smooth round hill, Kasane yama, on its north side, 860 feet high and surmounted by a clump of trees is conspicuous and well marks its position. In the north-west corner of the harbour under Kasane yama, is a small inlet (Ito ya ura), and at the head of the harbour (Ata no ura) is a large village.

Anchorage.—To enter, pass 2 cables South of Ali sima and steer N.E. by E. passing the small islet, Tobi sima, under Kasane yama, at a cable distance, and, bringing it to touch the north point of Ali sima, anchor near the head of the bay in 6 or 7 fathoms, mud bottom, with the hill bearing W.N.W., or with the rocky summit, 826 feet high, in line with the west point of Ito ya ura (bay) bearing N. ¾ W. Yura no uchi affords safe anchorage during heavy weather, or a typhoon. The channel north of Ali sima is equally safe, provided a berth of a cable is given to the shore on either side.

Tides. — It is high water, full and change, at Yura no uchi, at 6 h. 0 m.; springs rise 5½ feet, neaps 4½ feet.

HINO MISAKI, being at the turn of the coast, is the most prominent cape in the Kii channel. Its terminal hill, Hino yama, is smooth-sloped, 675 feet high, and the islet off it may be passed at 2 cables. It is steep-to, but the tide sweeping out of the bay south of it, causes an appearance of broken water, especially with a northerly wind. Thence the coast extends south-eastward for 19 miles to Tanabe, and parallel to the line of the outer capes, but falls back within them from 2 to 4 miles. The shore is hilly with a strip of low land along the beach ; the interior is mountainous.

Hidaka kawa.—At 2½ miles E.N.E. of Hino yama, on the east of the range extending from it, is a high flat topped saddle of nearly 1,000 feet elevation, and very conspicuous from the south-east. It overlooks a large plain, through which a small river, the Hidaka kawa, flows into the sea at the eastern extremity of a long sandy beach.

Anchorage. — Along this beach anchorage may be obtained in 4 to 9 fathoms at about half a mile off shore, the water being deeper and the shore steeper on the west, than near the river entrance. The best position for anchoring is with the end of the trees on the beach bearing N.W. Small junks enter the river, which has a long sandy spit off its west point of entrance, and there are some reefs off the shore on the east.

No sima reef.—The only danger in approaching the above anchorage is a large flat reef (Nosima), the inner part of which is 15 feet above high water; it lies two-thirds of a mile off the coast, a mile south of the river's mouth, and it is connected with the shore by a shallow ledge of one to 2 fathoms water with several rocks awash on it.

A wooded hill range rises on the coast to the south-east, and on its summits are gravel patches; the eastern summit is most conspicuous, having a single tree on its bare shoulder.

ILIBE SAKI.—The round smooth hill, Kirime yama, rises over this prominent point which has some bushes on its summit, and is the western extremity of a small range. It is bordered by a low cliff with some large rocks off it, which are bold of approach. The coast to the south-east of the range has several outlying reefs, the largest of which extends 4 cables off Arari point in detached parts, and its extremity is S.W. by W. ½ W. 3½ miles from Ilibe saki.

Anchorage.—Eastward of Arari point is a bay affording good anchorage in 5 to 8 fathoms. It is entered by passing north of the two wooded islands Ichi no sima, lying close together and about 100 feet high, and anchoring at half a mile from the beach. Reefs extend 4 cables from the cliffs on the northern shore of the bay inside Arari point, but the beach at the head of the bay appears clean and shelving. There is a shallow water entrance eastward or inside of the Ichi no sima, carrying 3 fathoms close to the islands. A chain of detached rocks above water extends 2 or 3 cables to the southward of them.

North of Arari point is a round hill, on the summit of which are three spike-shaped monuments; and 3 and 4 miles inland, north and north-east of this, are two large hill clumps which are very conspicuous from the offing. Off the low point a mile south-east of Ichi no sima are large masses of flat rocks, a little above high water, but which are steep-to.

Maruyama point, 1½ miles south-west of this, and which is the north point of entrance to Tanabe bay, is low and wooded, as are the two islets Ebi sima to the north-west of it, around all which are large reefs. The bay north of Maruyama point may probably afford anchorage at its inner part in less than 7 fathoms.

TANABÉ BAY,* is an extensive bight of the coast 22 miles south-west of Hino misaki, its outer parts exposed only to West and N.W. When approaching from the south-eastward, Itsiye misaki, the most projecting point of the coast, will first be made, and being very similar to cape Tanabé, the bay between them, in thick weather, may be mistaken for that of Tanabé. Itsiye misaki is a sloping point with a low terminating cliff, but the hills over it are much higher than those of cape Tanabé, and rise to a sharp peak, the outer of a continuous high range. The summit of cape Tanabé, which has a single conspicuous tree on it, is only 539 feet high, and falls abruptly inland. Outwards a long ridge slopes gently towards the sea, with a dark clump of trees on the brow, from which it falls steeply.

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* *See* Admiralty plan:—Tanabe Bay, on sheet, No. 357; scale, $m=3\cdot0$ inches.

Isaki reef.—The cliffs which border the cape are bold of approach, but Sato saki, north of the cape, is very dangerous, a reef with two islets on it extending north half a mile from the point; and the Isaki reef of flat rocks above water lying that distance west of it. There are sunken reefs and shoal water between the latter reef and the point, and off both reefs the shoal water extends 2 or 3 cables beyond the outer visible dangers.

Saito and North bay reefs.—In the north-western part of entrance of Tanabé bay are the Saito and North bay reefs, 4 cables apart, with a deep water channel between them. These reefs are low and quite flat. At 2 cables distance S.E. and North of Saito, the southern of them, are sunken rocks, and off North bay reef is a small rock like a boulder. There is a deep water channel between these reefs and Maruyama point (the north point of Tanabé bay), off which shoal water extends 3 or 4 cables.

Within these dangers there is safe approach for a mile, but farther is a mass of reefs, rocks, and islets, which must be approached with great caution, as in the partial survey of this bay some dangers may have been omitted, although according to the doubtful testimony of the fishermen no others exist than are represented on the chart. In bad weather with the wind in, all the known dangers would break.

Anchorage.—The best anchorage is in the south-eastern arm of the bay, south of Anchorage island. This island may be recognized by the dark trees dotted over it, and a tree islet west of it, from which a long uncovered reef extends. The end of this reef may be passed at a cable; then steer to pass the same distance of the north-east point of Anchorage island, between it and the sunken rocks of Passage reef in 6 to 10 fathoms, irregular bottom. Having passed along the east side of the island, stand in S.W. ½ S., anchoring in 10 to 8 fathoms, in a secure and thoroughly sheltered position. There is moderately deep water in the arm to the south, as also in Hosono bay, but they are too contracted for good anchorage.

Binzli reef, lying in the centre of Tanabé bay, is an extensive reef with several rocks on it, dry and awash at low water.

North reef.—Extensive rocky patches, some of which dry 7 feet at low water, lie 2 cables northward of Binzli reef; they extend in an E.N.E. direction towards the shore.

Serpent rock, is a phtch of one fathom, the north-east edge of a reef lying 3 cables north-west of North reef, and 4½ cables S.S.E. from the islet off Maruyama point.

Tanabé.—The north-eastern part of Tanabé bay (only partially surveyed) has many shoals. On the north shore a small river enters the bay, running close under the white loopholed wall surrounding a residence of the Daimio, the imperial Prince of Kiisiu, hidden among the trees on the left bank at entrance. There is a small turfed earthwork on the west point of entrance, fronting which is an extensive dry reef and a shelving spit running south half a mile into the bay. Avoiding this, anchorage may be obtained in 22 to 24 feet water, south of the river entrance.

Better shelter in westerly winds would be found N.E. of the Binzli reef. To anchor stand in for the green earthwork east of the white wall of the Daimio's residence, bearing E.N.E. till Ebisima shuts in with the islet off Maru-yama point; then keep East and anchor in 6 to 4 fathoms. The low rock of Binzli always shows.

The village of Tanabé stands on the shore of the sandy bay to the westward of the river, and to the north is a mountain range, the highest part of which rises to the hight of 2,650 feet.

Tides.—It is high water, full and change, at Tanabé at 6h. 0m.; springs rise 6 feet, neaps $5\frac{1}{4}$ feet.

The COAST, from Itsiye misaki to Siwo misaki, a distance of 20 miles, is rocky and indented by many small bays, in each of which are small fishing villages. The hills rise abruptly from the coast to a considerable height, most of them being covered with coarse bamboo grass. The principal places in which small junks seek shelter are Susami anchorage and Hiki gawa. Large vessels during easterly gales will find an anchorage in Fuku ura, close northward of Siwo misaki.

ITSIYE MISAKI, 231 feet high, is $6\frac{1}{3}$ miles S.S.E. $\frac{5}{8}$ E. from cape Tanabe, the intervening coast forming an open bay $1\frac{1}{2}$ miles in depth. At a distance of three-quarters of a mile N.N.W. from the cape is another headland similar in shape, 371 feet high; the hills from these points rise gradually to Ikazaka yama, 1,495 feet high; and $1\frac{3}{4}$ miles northward of this mountain is the summit of another range, 1,693 feet high. The coast in the vicinity is composed of low cliff and shelving rocks, extending on an average, three-quarters of a cable from high-water mark; depths of 11 to 18 fathoms will be found at a distance of a quarter of a mile off the cape, and 50 fathoms at a distance of $1\frac{1}{4}$ miles.

Atagi saki, $2\frac{3}{4}$ miles S.E. from Itsiye misaki, and $1\frac{8}{10}$ miles westward of the entrance to Susami anchorage, is a point, having a few small detached rocks off it; it may be recognised from the offing by a sandy beach $1\frac{1}{4}$ cables long close westward of it, in the centre of which, at high water mark, there is a conspicuous, yellow topped, sandy hillock; at the east extreme of this beach is the entrance to the Hiki gawa, where small junks find excellent shelter from all winds.

SUSAMI ANCHORAGE, adapted only for small coasting vessels during off-shore winds, is 2¾ cables in extent east and west by 2½ cables north and south, and has an average depth of 3¾ fathoms. It is protected by a wooded islet, 258 feet high, situated between two rocky points, off each of which are numerous rocks above and below water; the outer dangers, however, are always visible, those on the east being 8 and on the west 12 feet high. Nearly midway between the two outer rocks and 3 cables S. by W. from the west extreme of the wooded islet, is an isolated patch of rocks; this danger with the other rocks lying one cable southward of the islet, and those off the east point of the anchorage, render the channel on the east side of the islet impracticable. The village of Susami is on the east shore, on the south bank of the entrance to a river, off which, on each side, a bank extends three-quarters of a cable.

Directions.—Susami anchorage should only be used in case of necessity, and never entered by night, as the dangers are numerous and the channel only 1¾ cables wide.

The wooded islet stands out prominently when seen from the south-westward, as the high hills immediately over Susami are not wooded.

If entering from the south-west, approach the west extreme of the islet on any bearing between N.E. by E. ¼ E. and N.N.E. ½ E.; the former leading close east of the outer rock (12 feet high) on the west side of the channel, and the latter bearing leading close west of the outer isolated danger distant 3 cables from the islet. Pass the west extreme of the islet at about three-quarters of a cable distance, and anchor in the centre of the harbour in 3¾ fathoms.

Abuka saki, 3⅓ miles S.E. by E. ½ E., from Atagi saki, may be recognised by a small black rock, 12 feet high, nearly 3 cables south of it, and Double hill, wooded, 936 feet high, just over it. The hill is easily recognised when seen either from abreast of Itsiye misaki to the westward, or Siwo misaki to the eastward. The rock is steep-to, there being 21 fathoms at 1¾ cables south of it.

Oke no Kuro sima, situated E. by S. ½ S., about 2 miles from the rock off Abuka saki, and 2¼ cables off shore, is 300 yards long, divided into three portions; the summit, on the north side, being of triangular shape, and 147 feet high. North-eastward of Oke no Kuro sima, distant 3 cables, are several detached rocks above water. A depth of 21 fathoms is found 3 cables south of this islet.

Edsu saki, 2 miles E.S.E. of Oke no Kuro sima, is a projecting point, the extremity of a flat wooded islet a quarter of a mile long, surrounded by shelving rocks, the north point of which is connected at low water to the mainland. This point should not be approached nearer than half a mile, as two off-lying rocks, awa at low water, lie 2¼ cables west of it. There is a depth of 13 fathoms one quarter of a mile from the point, and 70 fathoms is found at a distance of 1¾ miles south of it.

The COAST eastward of Edsu saki as far as Arida bay, is broken by numerous small bays, off which are rocks and small islets. So sima, a double peaked islet, 112 feet high, is the most conspicuous, being at the entrance to Eda ura, a bight three-quarters of a mile in depth.

Yoko jima, a little over one mile westward of So sima, is 55 feet high.

The hills rise steeply from the coast, and are bare; the summit of them, (Oyama) is flat, and 1,739 feet high.

Fuku ura, a bight north of Siwo misaki, on the west side of the low isthmus of Oö sima harbour, offers protection to vessels from easterly winds the anchorage being in 7 to 10 fathoms, 4 cables North of a conical yellow cliff, with flat head, bearing S.W. ¾ S. The coast of this bay is fringed with shelving rocks which dry nearly two cables from highwater mark.

SIWO MISAKI, the south point of Nipon, is the south-west extremity of a promontory of table land which forms the western shore of Oö sima harbour. The shores of this promontory are rocky, and skirted with many small islets and off-lying rocks, the latter drying some considerable distance from high-water mark. There is a strong tide race and heavy overfalls off Siwo misaki both during the flood and ebb; they are, however, heaviest on the flood. After a south-easterly gale the sea comes round this point in heavy rollers.

LIGHT.—On the summit of Siwo misaki, at an elevation of 163 feet above the sea, is exhibited a *fixed* white light, of the first order, visible in clear weather from a distance of 20 miles. The light is seen from seaward through an arc of 218°, or between the bearings of W. ½ N. (through North and East) and S.E. The tower is 75 feet high, built of stone, and painted white.

Bottle rock lies 2½ cables south of Siwo misaki, and foul ground extends 1½ cables further southward.

Directions.—At night, when proceeding southward from the Inland sea through the Kii channel, it is recommended to steer for Hino misaki. The course from Isumi strait is South 25 miles, and from Naruto passage S.E. by S. 30 miles, which latter course, continued for 25 miles farther, passes Itsiye misaki at a distance of about 3 miles, from which position a S.E. by E. ¾ E. course for 21 miles leads to abreast Siwo misaki.

THE SETO UCHI OR INLAND SEA OF JAPAN.

GENERAL DESCRIPTION.—The great inland sea of Japan, called by the Japanese Seto Uchi* (Inner strait) is enclosed between the south-west coast of Nipon, which entirely bounds it on the north and east; and the islands of Kiusiu and Sikok, which bound it on the west and south. It extends somewhat in an east and west direction, in length 240 miles, with a breadth varying from 3 to 30 miles. It has six divisions called nadas (seas), taking their names generally from the provinces, the coasts of which they wash; thus, the eastern part of the sea as far as Akashi strait is named the Isumi nada; and proceeding west, there follows in succession the Harima nada, Bingo nada, Misima nada, Iyo nada, and Suwo nada.

The Seto Uchi contains upwards of 300 islands and rocks, with numerous shoals and dangers, and has a sea-board of nearly 700 miles, on which are situated numerous large towns and several of the provincial capitals; and it abounds also with safe and convenient anchorages. It communicates with the Pacific by the Kii channel on the east, and by the Boungo channel (between Kiusiu and Sikok) on the south; and with the sea of Japan, by the strait of Simonoseki, on the west. There is a great maritime trade along its populous shores as well as the through traffic to Ōsaka, one of the chief seats of commerce of the empire, and the seaport of its ancient capital, Kioto.

The Seto Uchi, can be navigated with safety at all seasons of the year and under most circumstances during the night, the more particularly now that it is lighted and a correct chart has been published from the surveys of Captain St. John, Commanders Ward, Bullock, Brooker, and Navigating Lieutenant Maxwell, Lieutenant Banaré of the French Navy, and the Japanese manuscript survey.† Fog is the only hindrance to navigating the Seto uchi.

In the winter months, when the westerly gales are so prevalent sailing vessels would probably gain time by tiding through this sea, rather than by endeavouring to beat round Sata no misaki (cape Chichakoff), against the Kuro Siwo or Japan stream. As an instance of this, a fine clipper ship was nearly three weeks getting round cape Chichakoff, whilst the *Actæon* sailed through the inland sea in nine days, meeting with only one westerly gale, and anchoring every night.

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* *See* Admiralty chart:—Seto Uchi, No. 2875; scale, $m = 0{\cdot}25$ inches. H.M.S. *Cruiser* in 1859 was the first of H.M. ships to navigate the Seto Uchi.

† The description and directions contained in this chapter are compiled principally from the surveys and remarks of Commanders Ward, Bullock, Brooker, and St. John, Navigating Lieutenant Maxwell, and of M. Banaré, Lieutenant commanding the French Surveying vessel *Aspic*, 1870–73.

A very destructive species of Mollusk inhabits the Seto Uchi, and might prove very injurious to ship's bottoms. Specimens of new timber were found at Awa sima, the perforations in which were a third of an inch in diameter.*

Supplies.—Water of excellent quality can be procured almost at any anchorage in the Seto Uchi or Kii channel, and is brought off at a very small cost. Eggs, fowls, and fish can be obtained at any of the villages.

TIDES.—The tides and currents of the Seto Uchi are fairly well known: those, however, of the Boungo channel are unknown. The tide wave comes from the Pacific ocean by the Kii and Boungo channels; from the latter it branches east and west, meeting the Kii channel tide at about Awa sima, in long. 133° 38′ E., at the eastern entrance of the Bingo nada.

The times of high water have been correctly determined at several positions in the Seto Uchi between Simonoseki, its western entrance, and Akashi strait, at its eastern end; it has, however, been considered advisable and convenient to refer such observations of the currents as have been made to the calculated time of high water at Simonoseki, which is at 8h. 30m., full and change, and the making of the western (flood) stream is here given, the streams having been found as a rule to run six hours each way.

The western (flood) stream along the S.E. coast of Nipon makes the high water in the Naruto passage and Isumi strait. The western stream flowing along the north-east coast of Awadji sima also makes high water in Akashi strait, but the set of the tide on the flood through the strait is to the eastward. That from the Boungo channel also makes the high water at Simonoseki, but east of the Boungo, the eastern stream (probably from the Pacific by that channel) makes the high water as far as the Bingo nada. The direction of the streams at Simonoseki are given at page 436.

In the bay on south side of Hime sima, the western stream made at 4h. 30m. after high water at Simonoseki, and ran for six hours; velocity at neaps 2½ knots.

At 2 miles north-east of Waki mura hana, this stream made at 3h. 15m. after high water at Simonoseki, and ran six hours each way; velocity at neaps 2½ knots.

Kurusima strait, at 4h. 45m. after high water at Simonoseki; velocity at neaps 4 knots.

Awa sima, at 7h. after Simonoseki. Here the western stream ran for 5½ hours, the eastern for 6½ hours, but there was a westerly gale at the time.

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* The smallest defect in the copper, even to the absence of a nail, will at once be discovered by this destructive worm.—Captain H. C. St. John, R.N.

The apparent flood and ebb streams in Akashi strait do not change simultaneously with high and low water; off Maiko point the eastern stream makes at 0h. full and change; the western stream at 5h.: the tide made one hour later on the southern shore.

The maximum strength of both streams on the seventh day of the moon (at which time the observations were made) was 2½ knots, with an interval of slack water of about half an hour.

The southern stream in Isumi strait appeared to be simultaneous with the eastern stream in Akashi strait.*

The tides in the Naruto passage are given at page 347.

The tides run strongly in the narrow channels, especially on the western stream, and whirl about very considerably, so as sometimes to render steering difficult.

ISUMI STRAIT, between the south-east point of Awadji and Nipon, is divided into three channels by the islands Tomangai and Diyi.

Tomangai sima, the western island, is wooded, with the exception of its west hill, cleared apparently for military purposes; there is a fort close to the north of the south-western point across a small ravine, and facing the west.

Diyi sima is wooded, but lower. The west or main channel is 2 miles wide, but contracted by a sand-bank which extends half a mile off the large fort of Yura, and by reefs stretching 3 cables off the south-west part of Tomangai. The centre passage is only one cable wide, and full of rocks. The eastern channel is a quarter of a mile wide, and said to be clear and safe, between the reefs which extend 1½ cables off both shore and island.

A mid-channel course through the western channel between the shore of Awadji sima and the lighthouse on the west point of Tomangai sima is the route generally adopted.

LIGHT.—On the western extreme of Tomangai sima, stands a lighthouse 30 feet high, from which, at an elevation of 208 feet above the sea, is exhibited a *fixed* white light of the third order, visible seaward when bearing between N. ½ W. (through east and south) and S.W. by W., and should be visible in clear weather from a distance of 19 miles.

The ISUMI NADA, at the north-east extreme of the Inland sea and 35 miles in extent N.E. and S.W., is bounded on the south by a promontory of Nipon, and on the west by the large mountainous island of Awadji. Its shores are in general high and thickly wooded; in some places, however, they are low and sandy, and it is singular in having neither an island nor a danger in it. On the east shore of Awadji the water is deep, with no convenient anchorages except in small bays close in. The coast of Nipon, on the contrary, affords good anchorage along its whole extent, reefs only extending one or two cables off it.

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* This is not at all certain.

ŌSAKA,* a city of great commercial importance, stands on the north-east shore of the sea, on the left bank of the Yodo gawa, which takes its rise in the great inland lake, Biwa, and after flowing on a south-westerly course for 30 miles, enters the Isumi nada by several channels. At the lower or north-western corner of the city the river divides into two branches—the Agi kawa, as the Yodo is here called, continuing directly towards the sea; the other branch, the Kidsu or Kishu gawa, taking a southerly course, and discharging its waters 2½ miles lower down the gulf: these two branches are navigable by junks of moderate size, but the heavier classes are compelled to discharge their cargoes in the roadstead. Ōsaka is the seaport of Kioto, the ancient capital of Japan, which is situated 20 miles to the north-east, on a branch of the Sodo gawa.

The city is intersected by several canals, which are mostly very shallow and only navigable by the flat boats of the country. The castle of the former Tycoon is on the north-east of the city, overlooking the river.

The Foreign concession, named Ebisu jima or Kawa guchi, occupies the angle formed by the Agi and Kidsu branches; its position is indicated by lofty trees; the right of building is confined to this site, but the right of residence extends over the contiguous suburb westward. It is 2¾ miles above Temposan, the fort at the river's mouth, and two miles below the castle.

The populatiom of Ōsaka is about 400,000. The foreign trade is increasing, the imports consisting mostly of sugar, drugs, and eastern produce. The exports are mostly for the Chinese market, and the entire trade is in the hands of native merchants.

The river Agi,† which enters the Isumi nada between two jetties, the northern of which is over half a mile long, is shallow, but may be navigated by ships' boats as far as the castle; it has a bar, which at unusually low tides would be nearly dry; at exceptionally high tides, 7 to 9 feet might be carried over. On the south side of the entrance is the large fort of Temposan commanding the entrance to the river; it is a high turfed earthwork scarped with masonry, and is conspicuous; the shores in its vicinity being very low. The channel into the river over the bar is marked by large piles, the two outer having triangular vanes to distinguish them; the shallowest part is just outside these outer beacons, and the best passage over is at one third the distance from the north beacon, so as to avoid a shoal extending south-west from the other; when inside, the deep water is close along the groynes on the south side, which always show There is generally 3 feet more water in the lower part of the river than on the bar.

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* *See* Admiralty plan:—Hiogo and Ōsaka, No. 16; scale $m = 1 \cdot 0$ inch.

† *See* Admiralty plan:—Entrance to Agi Kawa, on sheet No. 16; scale, $m = 6 \cdot 5$ inches.

The Yodo gawa flows from the southern extremity of the lake Biwa (35 miles in extent), at 30 miles north-east of its mouth. At 20 miles from the sea the river receives the waters of two other streams from the north-west and south-east. At 3 miles above this junction, at the confluence of several small streams or canals, stands Kioto, or as it is commonly called Miako or metropolis. It is situated on a highly cultivated plain. Its walls are said to be 30 miles in circuit, and it is governed by a viceroy appointed by the Mikado, his jurisdiction limited by the canals round the city.

LIGHT.—On the parapet of the western salient angle of Temposan fort, 53 feet above the sea, is exhibited a *fixed* white light, shewn seaward between the bearing of N.E. by E. ⅔ E. (through north and west) to S.W. by W., and is visible in clear weather from a distance of 12 miles. The lighthouse is a square-shaped white wooden building, 35 feet high.

ÖSAKA ROADS.—The roadstead of Ösaka is open to the west and south. The depths in the roadstead are extremely regular, diminishing gradually over a soft mud bottom; the holding ground is so good that it is considered a vessel could ride out any gale in safety. The shores are everywhere of clean sand (as are the river bars), but it constitutes a fringe only, mud being found at a cable from the low-water line.

Anchorage.—It is not advisable to anchor in less than 4 fathoms, as south-west winds cause much sea. There are 4 fathoms at 7 cables from the lighthouse, and 7 fathoms at 1⅓ miles. To the southward it is much shoaler. The best anchorage is with the lighthouse on fort Temposan bearing East, at 1¼ tc 1¾ miles distant, and in 4 to 5 fathoms.

Directions.—From within the bar keep the south bank of the river, which will lead up in a nearly direct course to the Tycoon's castle (above the first bridge the river is seen to turn off sharp to the south; this is the Kishu branch), keep close past the Concession, but in the same direction, for above this the river has two distinct channels, separated by narrow islands and shallow sand-banks, which can seldom be crossed.

Boats may be obtained just above the fort, or at Ichiokashiuden on the left bank, 2¼ miles higher up.

The Kishu gawa.—Two miles S.S.E. of Ösaka bar is the bar of the Kishu or Kidsu, at the north point of entrance of which river is a small star fort (fort Daiba) situated at low-water mark a mile from the shore. This bar has not been closely examined, but it is probably a little deeper than that of the Agi, as a larger class of junks ascend this branch to Ōsaka. The channel over the bar is marked by beacons.

LIGHT.—From a lighthouse 29 feet high, painted in *black* and *white* in horizontal bands, situated on the eastern bank, at Kidsu gawa entrance, is exhibited at an elevation of 40 feet above the sea, a *fixed red* light of the sixth order, which should be visible in clear weather from a distance of about 8 miles.

SAKAI RIVER.*—S. by E. 4½ miles from Temposan is the mouth of the Sakai river, which enters the sea between two short moles extending from two green batteries; it has no bar, and has a depth of from 3 to 6 feet at entrance, between the piers, afterwards opening into an artificially made harbour nearly one quarter of a mile in extent, over which is a depth of 5 and 6 feet at low water.

LIGHT.—From an hexagonal, white wooden lighthouse 37 feet high, situated on the end of the southern pier, at the entrance to Sakai harbour, is exhibited at an elevation of 53 feet above the sea, a *fixed green* light of the fifth order, visible in clear weather from a distance of 10 miles.

HIOGO AND KOBÉ,† a treaty port, 12 miles west of Ōsaka, is a better and more convenient anchorage than the roadstead of Ōsaka, having slight protection from the south, and being thoroughly sheltered from the westerly or prevailing winds. The shores of Hiogo bay are steep-to, but low, and rise in a gentle slope from the beach to the abrupt range of hills 2 miles inland, which are of 800 to 2,000 feet elevation, running parallel to the coast, the wooded peak and temples of Mayasan (2,330 feet) being conspicuous. The bay has an even depth of 4¼ fathoms, with good holding ground, mud bottom. The foreign settlement is situated at the head of the northern bay of Kobé. This bay is somewhat smaller than that of Hiogo, but the shores of it are steep, and there is about the same depth of water as in the former, and if less sheltered in south-west winds it is less exposed to easterly winds.

Several streams flow into Hiogo and Kobé bays, the course of the two principal being broad sandy beds, the streams in which vary considerably in size according to the seasons. The Minato kawa, separating Hiogo bay from that of Kobé, is especially peculiar in this respect, the greater part of the year being only a small stream, whilst at times (during heavy rains) it fills its broad bed and overflows its banks, which are 30 feet above the streets on either side. During the autumn and winter months smallpox is very prevalent here.

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* *See* Admiralty plan:—Sakai, on chart, No. 16; scale $m = 9 \cdot 5$ in.

† *See* Admiralty plan:—Hiogo and Oösaka, No. 16; scale $m = 1 \cdot 0$ inches.

Two inner cambers, where boats and junks of considerable draught are completely sheltered, are situated at the eastern corner of the Concession, opposite which is the Custom house. A pier from the centre of the Concession also forms a camber in which junks are sheltered at all times, and a pier in connexion with the railway, which runs to Ōsaka and Kioto, allows of vessels going alongside to load and unload.

Hiogo exports tea, silk (raw), copper, wax, camphor, porcelain, &c. principally to America; and in 1879 there was a decrease in the value of the exports for the year amounting to 177,809*l.*, owing to the export of rice being prohibited. The principal imports are cotton and woollen manufactures, metals and kerosine oil, the increase on the value during the preceding year amounting to 333,011*l.* The number of foreign vessels, especially sailing vessels, visiting the port has considerably decreased.

British subjects are free to go wherever they please within 10 *ri* (21* miles) of Hiogo in any direction, that of Miako (Kioto) excepted, which city shall not be approached nearer than 10 *ri.* The crews of vessels resorting to Hiogo must not cross the river Ena gawa, which flows into the bay between Hiogo and Ōsaka.

Patent slip.—On the west shore of the bay is a patent slip, 300 feet in length, suitable for vessels of 800 tons.† There are facilities here for executing general repairs, and small vessels are built and engined.

Supplies.—Supplies of all descriptions may be procured at Kobé in abundance at tolerably cheap rates. Government coal is stored here in charge of a contractor, who also supplies fresh meat, vegetables, and water. Large timber, chiefly cedar (Sungi), is also procurable.

Time Signal.—A gun is fired at noon (Kobé mean time), Sundays and general holidays excepted, and a ball is dropped at the same time on a flagstaff on the bund.‡

LIGHT.—From an octagonal-shaped white wooden lighthouse, 51 feet in height, situated on Wada no misaki, the south-west point of Hiogo bay is exhibited at an elevation of 52 feet above the sea, a *fixed red* light of the fourth order, seen from seaward between the bearings of S.S.E. (through west and north) and E. by N. $\frac{1}{2}$ N. ; it should be visible in clear weather from a distance of 12 miles.

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* The *ri* is 4,275 yards according to treaty.

† Another slip is being constructed, which when completed will take vessels of 1,000 tons at all times of tide.

‡ Cannot be depended on for rating chronometers.—Captain Hollman, German war vessel *Elisabeth,* 1883.

From a staff on the eastern pier head, at an elevation of 42 feet above the sea, is exhibited a fixed *green* light, which should be visible in clear weather from a distance of about 6 miles. The staff and dwelling are painted white.

A similar *red* light, but of inferior power, is shown from a staff on the western pier head.

Directions.—If entering Hiogo at night from the west, keep the light on Matsu-wo-no hana (p. 368) bearing West (on which bearing it will be just visible) until the *red* light on Wada no misaki bears North, when steer N.N.E. for the anchorage; and when the shipping lights are seen bearing N.N.W. or N.W. steer for them and anchor as convenient. Bound to Kobé from the southward; after passing Isumi strait steer N.N.E. ½ E. for Wada no misaki light, and when the light on Matsu-wo-no hana opens out, haul to the eastward until Wada no misaki light bears North, when proceed as before mentioned for the anchorage. It must be borne in mind that the ebb tide sets to the westward towards Akashi strait, and the flood to the eastward towards Ösaka, 2 knots an hour at springs, increasing in strength as Akashi strait is approached.

The coast as far as Tree point, 9 miles eastward of Kobé, is safe of approach, the shore being steep into 4 fathoms, except the bay directly east of Kobé, where there is a sand-bank of less than 2 fathoms extending half mile off shore.

Tides.—It is high water, full and change, at Hiogo at 7h. 15m.; springs rise 6 ft.; neaps 4 ft.; neap range 2 ft. 6 in. The range of any day seldom exceeds 5 ft. at springs or 1 ft. 6 in. at neaps.

At Ösaka bar no perceptible differences in the range, from the above, could be observed. At Ösaka Concession the establishment is 8h. 17m. Spring rise 30 inches, neaps 6. The flood stream does not reach the Concession. At neaps there is only one tide in the 24 hours, and a strong S.W. wind with low barometer may raise the level of the Isumi nada two feet.

The direction of the tidal streams, which are sometimes strong off Hiogo point, are, the flood to the eastward and the ebb to the westward. In Ösaka roads they are weak and irregular.

ICHI-NO-HANA YAMA, (End hill) is a wooded granitic hill 820 feet high, 5 miles to the eastward of Akashi, the end of the range running from Kobé, and falling abruptly to the sea. The land to the westward of this hill is comparatively low, and stretches away like a long table land as far as the borders of the province of Bizen; having high ranges in the background, and two conspicuous hills, with clumps of trees at their summits, north-west of the town of Akashi. The coast is sandy, with numerous villages along it.

Taka iso, a rock with 9 feet on it at low water, lies nearly a cable off shore, 5½ cables to the westward of the village of Shiwoya.

Hira iso, are the highest pinnacles of a bank of rock and shingle, lying 4 cables from the shore, having 6 feet on them at low water. The eastern lies E. ¾ N. 3¼ miles from Matsu-wo-no hana (the north point of Awadji sima). South from it, and quite close to, is the wreck of a Satsuma steamer, having two feet on it at low water. To clear them the light on Ye saki (Awadji) must be kept bearing West, until Ichi-no-hana yama bears N.E. The stone fort at Maiko in sight, bearing N.W. ½ W., clear of the trees on Kara saki, leads to the westward of Hira iso.

Buoy.—A *red* buoy surmounted by a circular cage (the top of which is 15 feet above the water) is moored immediately south of Hira iso, in 5 fathoms at low water.

AKASHI NO SETO (Akashi strait),* between the north point of Awadji sima and the coast of Nipon, is nearly 2½ miles wide, the above rocks Taka iso and Hira iso, being the only known dangers when approaching it.

Akashi.—This town is in the district of Akashi, province of Setsu on the mainland of Nipon; and contains the residence of a Daimio, the four white towers of which show out plainly against the surrounding dark foliage.

Yamata ura, between the dark wooded point of Kara saki and the conspicuous granite fort at Maiko to the eastward, and the town of Akashi to the westward, affords good anchorage, with winds from North-west round by north to East, in 9 fathoms, sand, good holding ground.

Yamata iso, a rock in the strait having 2 feet on it at low water, lies N.W. by W. ½ W. 3½ cables from Maiko fort. Care should be taken not to anchor within 5 cables of the fort. The tides take the line of the coast, and have at springs a velocity of 2¾ knots.

Tides. — It is high water, full and change, in Akashi strait, at 6h. 27m.; springs rise 3½ feet, neaps rise one foot. The tidal streams about Akashi no seto are variable, causing heavy tide ripps, particularly off the west end of the town of Akashi where they all meet. About a mile south of the western end of the straits, the tide turns to the eastward at the time of low water at Maiko, and runs through the strait about 7 hours.

The stream turns to the eastward on Shika no se 1½ hours before high water at Maiko.

On Murozu no se it turns to the south-westward at high water, and runs half an hour less than the north-easterly stream.

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* *See* Admiralty plan:—Akashi no seto, No. 93; scale *m* = 1·5 inches.

Close to the shore at Maiko the stream turns with the tide, the flood running to the eastward. The maximum strength of both streams on the seventh day of the moon was 2½ knots, with an interval of slack water of about half an hour.

AWADJI SIMA, the largest island of the Inland sea, is 30 miles in length north and south, and 14 miles across at its southern or broadest part, which is between the projecting promontories of Nipon and Sikok, at the eastern entrance of this sea from the Kii channel, which it divides into two passages, the strait of Isumi on the east, and the Naruto passage on the west. Awadji is mountainous, the main range being from one to two thousand feet in height, but the hills taper away towards its north cape, which is low and sandy, with batteries on it.

Matsu-wo-no hana, the north point of Awadji sima, is terminated by a white stone fort with seven guns "en barbette," and is steep-to.

YESAKI.—LIGHT.—From a lighthouse 27 feet high, situated on Yesaki, about half a mile W. ½ S. of the extreme point, Matsu-wo-no hana, is exhibited, at an elevation of 158 feet above the sea, a *fixed* white light of the first order ~~visible~~ seaward between the bearings of West (through South and East) and N.E. by E. ¾ E.; and should be seen in clear weather from a distance of 18 miles.

Ye sima, and Ko-ye sima, 47 feet and 40 feet high respectively, are two cliffy peninsulas on the north-eastern end of Awadji sima, which forms the southern shore of Akashi no seto; the latter is wooded, and apparently detached when seen from north-west or south-east. They lie at the south end of the village of Iwaya, off which there is excellent anchorage (with winds from south round by west to north-west) in 8 fathoms, with Ko-ye sima S. ½ E. half a mile. The tidal streams set the flood from north-west and ebb from E.S.E., with a velocity at springs of 2½ knots.

The WEST COAST of AWADJI SIMA generally is steep, sloping from wooded hills, and bordered by numerous villages. The hills rise to a remarkable wooded and cliffy nob named Jioriuji, 1,746 feet high, from which a bare spur runs to the sea, having on its western summit, known as Karuto yama, a remarkable single tree, 1,022 feet above high water.

TSKUYE NO SE, a shoal having 2 feet on it at low water, lies 7 cables from the shore, about 6 miles to the south-west of Matsu-wo-no hana. From it the water gradually deepens to the westward; 5 fathoms being found at one mile from the shore. Anchorage, with the wind off shore, will be found outside this, in convenient depths of from 6 to 8 fathoms (sandy bottom) good holding ground.

Clearing mark.—To clear this shoal, the north extreme of Awadji sima should not be brought to bear northward of N.E. by E.

YE SAKI, a bluff point, wooded at the top, and cliffy on the north face, slopes down to the village of Yei mura, where there is a large camber, available for junks of 50 tons. In the middle of Yei ura, is the large village of Gunge mura, at the mouth of a river that drains an extensive and well cultivated plain.

Yei ura, the bay north of Ye saki, has a bank of sand stretching across it; 3 fathoms being found at 7 cables, and 5 fathoms at one mile from the shore, in the middle of the bay. The bank is steep-to, there being less than a half a cable distance between 6½ and 12 fathoms. Large vessels anchoring here should not let go in less than 8 fathoms. The bottom is of sand, good holding ground.

The COAST, from Tsuyi no hana to Maru yama is bold, sloping from a range, the summits of which are Dama yama, 787 feet, and Hichi-ga yama, 800 feet high, interspersed with cliffs, and fronted by a shingly beach. Numerous deep ravines sear the side of this range, the largest, Onagi tani, having at its base a pool of water.

Maru yama, 72 feet high, is a flat-topped peninsula, joined to Awadji sima by a neck of sand, on which stands a village. A reef, extends 2 cables off its north end, most of the rocks showing at high water, and the outermost of which must not be approached within a distance of 1½ cables.

Ben-ten sima, a sharp wooded islet 99 feet high, is connected on its north side by shallow water with Maru yama, but it may be approached on the south side to within a distance of one cable. Excellent anchorage will be found, with shelter from off-shore winds, in 6 to 8 fathoms, sand, 3 cables from the shore, with Ben-ten sima bearing North distant 2½ cables. Small vessels may anchor into a convenient depth, the water shoaling gradually from 12 fathoms towards the shore.

UREI SAKI, the next point south, is cliffy, with rocks extending half a cable from it. Between this and Maru yama the coast is bold, with rocks and shoal water stretching a cable off the points.

Anaga is a small village at the foot of a large plain between Urei saki and Tō saki. The anchorage off it is not good, as the eddies caused by the tide whirl vessels round their anchors continually.

Yubi sima, a thinly wooded islet about 130 feet high, lies in the middle of the bay between Anaga and Tō saki, the south-west promontory of Awadji sima. It is separated from the shore by a channel three quarters of a cable wide; has rocks that cover extending off its south point to a distance of one cable; and a rock awash lies close to its west point.

The bay has projecting ledges off all the points, rendering it useless as an anchorage.

The HARIMA NADA, lying between Awadji sima and Sozu sima, on the east and west, is a comparatively shoal expanse, having about 20 fathoms water over its deepest part; the southern portion of the sea is clear of dangers, but the northern portion is encumbered with numerous islands, rocks, and shoals, which form a group lying to the north-east of Sozu sima, and about 5 miles from the coast of the mainland. There are, however, deep water channels both between and around them.

In passing through the Harima nada the dotted track* should be as closely as possible adhered to, as some portions of this sea both on the northern and southern side have not been closely examined. Its southern shore from the Naruto passage westward for about 7 miles, as far as Matsu sima, is also as yet unsurveyed.

Shika no se, lying in the Harima nada, on the northern side of the western entrance to Akashi no seto, is a bank of rock, covered by sand and shingle, on which are depths of from 6 to 12 feet, extending W. by S. ½ S. and E. by N. ½ N. 2¾ miles, with an average width of 1½ cables. Its eastern extreme of 12 feet lies W. by S. ½ S., 8 miles from the lighthouse (stone lantern) at Akashi; and W. ¼ S., 8 miles from the fort on Matsu-wo-no hana. It is steep-to on the southern, but shoals gradually on the northern and western sides.

Buoy.—A red buoy, surmounted by a circular cage (the top of which is 15 feet above the water) is moored in 17 fathoms, at low water, 4½ cables southward of the middle of the shoal.

From the west extreme of the town of Akashi, in the direction of Shika no se, and almost connected to the latter by a series of shoals, is a bank of mud, steep-to on the southern side, but apparently joining the shore on the northern. To avoid this, the lighthouse on the north end of Awadji should not be brought to bear eastward of E. ¾ N.

The passage between Akashi town and Shika no se should not be attempted.

Murozu no se, also in the Harima nada, on the southern side of the western entrance to Akashi no seto, is a bank of sand having from 7 to 5¾ fathoms on it, lying nearly parallel with Shika no se, at 2½ miles southward of it. Although forming no obstruction to navigation, vessels usually pass to the northward of Murozu no se. The shoal patches of 5¾ fathoms lie respectively S.W. by W. ¾ W. 8 miles, and W.S.W. 9½ miles from the north extreme of Awadji sima. These patches go by various names among the inhabitants, that in general use being the above.

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* *See* Admiralty chart:—Seto Uchi, No. 2875; scale $m = 0 \cdot 25$ inches.

Directions.—On approaching Akashi strait from the westward a clear course may be made between the above shoal and Shika no se, by keeping the summit of Ichi-no-hana yama in line with the lighthouse on the north extreme of Awadji sima bearing E. by N. ½ N. or at night by keeping the light on that bearing.

Ichi-no-hana yama (end hill) just seen open of the lighthouse on Awadji sima leads between the Shika no se and Murozo-no se, for the south point of Sozu sima.

The NORTH COAST of SIKOK,* westward from the Naruto passage for about 7 miles, has not been surveyed.

Hikieta point, nearly 10 miles westward of Naruto passage, is formed by an isolated chain of hills, the rounded summits of which diminishing in height to the westward are partly wooded and partly cultivated. Its eastern side is bordered by several detached rocks and should not be approached within a distance of one cable. To the north-west of the extreme point is a small rocky islet joined to the coast by a spit of sand. The village of Hikieta is situated on the south side of the point, and extends along a sandy beach on both sides of the entrance to a small river.

Matsu sima, 1$\frac{2}{10}$ miles eastward of Hikieta point, is high on its north side, and bordered by rocks on its south-east side. Between this islet and Hikieta point is a rocky bank lying 2 cables W. ½ S. from the islet; it is 3 cables in extent, and is distinguished by two detached rocks on its east side, above water, and another only visible at low water. These rocks should not be approached within a distance of one cable.

Triple islet, 3 cables E.N.E. from Matsu sima, appears like three islets lying close together joined by a ridge of rocks.

Anchorage may be obtained in 7½ fathoms between Hikieta point and the above-mentioned rocky bank; with the two islets in line distant 3½ cables, and Hikieta point bearing W. ½ N.; the bottom (mud) is good holding ground.

Ioji hama is a massive, isolated, and thickly wooded hill, the high sharp summit of which is visible from a great distance. It is immediately over the coast which is bordered by cliffs, with off-lying rocks extending nearly 2 cables from it. Between this hill and Hikieta point, is a cultivated valley at the head of a small bay, in which there are salt-pans. A low tongue of land, in the form of a pier, extends from the south side of the bay nearly across to another low point on the north side.

Ioji hama no hana. — A third small isolated cluster of hills is situated north-west of Ioji hama, a low cultivated country fronted by a beach of sand and shingle joining the two clusters, and on the middle of which stands a temple gateway. The point terminates in a reef which extends half a cable to the north-east, and on which is a conspicuous pinnacle rock. There is a depth of 6 fathoms at 1½ cables from the point; and a detached rock lies close to the shore W.S.W. from it.

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* *See* Admiralty chart :—Harima nada, No. 137; scale $m = 0 \cdot 95$ inches.

F'tago sima, two high islets joined together by rocks, lie half a mile N.N.E. from Ioji hama no hana. At nearly half a cable E.S.E. from the southern islet is a detached rock; and another rock which is always above water lies three-quarters of a cable S. by E. from the same islet. The islets F'tago sima are surrounded at the distance of half a cable, by a rocky shoal, and they may be passed at a distance of one cable on the north side. In the passage between the southern rock and Ioji hama no hana there is a depth of 2¼ fathoms.

Stotz sima, lying a little over one mile N.N.W. of Ioji hama no hana, is an islet flanked on its north and west sides by large, high, rocks; it is steep-to, and may be approached to within a distance of one cable. There is a depth of 14 fathoms between this islet and F'tago sima.

MATSU URA, a bay one mile wide, lying immediately westward of Ioji hama no hana, affords good anchorage protected from all winds, except those between N.E. and N.W., in from 5½ to 6½ fathoms, good holding ground. On the beach in the middle part of the bay is the village of Matsu.

The COAST from Matsu ura westward as far as the small port of Ko Isso mura is steep-to, and forms an extensive sandy beach. A river, the bar of which dries out to a distance of one cable from the shore, waters a vast cultivated plain between Matsu ura and the village of Sanhon matsu, beyond which is the bed of a large mountain torrent. From Ko Isso mura the coast is formed by the foot of a high mass of land which terminates to the eastward in a chain of hills surrounding Tsuda bay. Dino yama, a remarkable sharp peak, thickly wooded, slopes towards the sea, forming Ko Isso point, off which lie the Marukame islets.

Marukame islets are joined to each other and to Ko Isso point, at low water, by sand-banks. The outer islet is high, round, and wooded, having on its summit a remarkable tree; southward from the islet, at a short distance from it, is a rock. The other islet is less elevated, very flat, and covered with brushwood.

Ino sima, 5 cables W.S.W., rises suddenly to a sharp peak, slopes towards the coast and terminates, to the south-west, in a sandy spit which uncovers at low water, and between which and the coast is shoal water.

The range of hills to the westward gradually decreases in height from the wooded peak of Dino yama, as far as two conspicuous summits, each of which is crowned by a remarkable clump of trees. Thence they continue decreasing in height, again rising to a high peak, on which is a single tree. Westward of this peak the range presents the appearance of a series of bluffs, at the foot of one of which (having on it a conspicuous clump of trees) is situated the village of Tsurua. Another bluff with a wooded summit, forming part of the same chain, overlooks, the town of Tsuda.

MASIMA BAY.—The COAST westward of Ko Isso point is formed of several projecting cliffs, between which are small sandy beaches as far as Ounobe yama, 2 miles distant, the termination of which isolated wooded hill forms a point, between which and the Marukame islets, is the bay of Masima, where there is good anchorage in 6 fathoms. A small bluff, thickly wooded, and surmounted by a remarkably large tree is joined by a lower wooded range to the east side of Ounobe yama.

Rocks.—At half a cable to the eastward of the above-mentioned wooded bluff is a rock nearly joined to the shore at low water. Another reef of rocks lies 1½ cables N.E. from the northern point of the same bluff; and a third reef lies half a cable eastward of Ounobe yama, and 1½ cables N.N.W from the wooded bluff. The tops of these rocks do not cover at high water.

Kinu or Nao sima is a small islet, lying 2 cables north-east of the northern point of Ounobe yama; it rises precipitously from the sea, and a reef extends some distance from its south-west extreme.

Kasira siro, a rock which is never covered, lying 3½ cables E. by N. of Nao sima, is steep-to on its north and west sides, and is the head of a bank on which several boulders uncover at low water. At 1½ cables south-east of Kasira siro is a dangerous rock which covers at spring tides. These two rocks are the summits of a bank about 2 cables in width, on which are depths of from 1½ to 4¼ fathoms.

SOZU SIMA, a large and lofty island, in about the middle of the Harima nada, is 12 miles long and 7 miles wide, and its shores, deeply indented, afford in many places safe and convenient anchorage, especially on its southern side. A high ridge of mountains extends right across the island, the loftiest peak (upon which is a temple) O shiga mine, being 2,686 feet above the sea. Nearly 2 miles west of O shiga mine is another summit, 2,555 feet, whence a flat, rocky ridge, with steep cliffs on its east side, branches off to the south-west towards Djizo hana. This ridge, which is densely wooded and is tenanted by numerous hordes of large red haired monkeys, is joined by a comparatively low shoulder to the western peak, and this latter summit, when seen from the south-east, has a particularly peculiar appearance, somewhat resembling a horn. A second rocky plateau much lower (1,423 feet high) towers over Ikeda bay, 2 miles further west ;

it falls steeply on its north-west side. The spur which forms the high land of Djizo hana (separating Uchi no umi and Ikeda bays), consists of a series of peaks of which Black peak 880 feet high, is useful as a leading mark for entering Uchi no umi. Thence the range gradually lessens in height, until it terminates in the conspicuous double summit (wooded) 994 feet high, immediately over the precipitous bluff of Djizo hana.

KANEGA SAKI, the north-east point of Sozu sima, is conspicuous only by having a sharp, wooded, peak, immediately over it. On the south side is a small bay (Iosida) affording shelter for small native craft.

O Hana is the extreme of a small peninsula, the summit of which is 348 feet high; it is joined to the mainland of Sozu sima by a low sandy isthmus, and forms the northern point of F'kuda bay; off its north-west point a reef extends about one cable.

F'KUDA BAY, between O Hana and the small island Ko sima is one mile wide. On a sandy beach at its head is the village of F'kuda, near which a stream enters the sea between two high moles. There are depths of 9 to 12 fathoms in the centre of the bay, and excellent shelter may be had from all except N.E. winds.

Anchorage.—The best position is in 10 fathoms, with the rock 20 feet high (to the southward) in line with the west end of Ko sima.

Tides.—It is high water, full and change, in F'kuda bay at 10h. 15m.; springs rise 5½ feet, neaps rise 3 feet.

Ko sima is an islet about one-third of a mile in length (east and west) and less than one cable wide; it lies a little over one cable from the shore to which it is nearly connected by a reef. The island forms in several rocky summits, the highest being at the western end. Close off its east extreme is a sunken rock.

O Isso, a rock 19 feet high, perpendicular on all sides except the north-west, and steep-to at half a cable distance, lies one mile E.S.E. from O Hana.

Manaita rock, on which is a depth of 6 feet at low water, lies a little less than 7 cables S.W. ¾ S. from O Isso. The rock is one cable long and three-quarters of a cable wide, and is steep-to all round.

Hinden rock, which dries at low water spring tides, lies about 4 cables S.W. by S. ½ S. from Manaita rock, and 6½ cables E. ¼ N. from the east point of Ko sima. The rock is about 1½ cables long, and half a cable broad.

The COAST of Sozu sima from Ko sima trends about S. ½ W. for a distance of 4 miles. At half a mile from Ko sima, close to the shore, is the rock 20 feet high before mentioned. At three-quarters of a mile south of the rock is the village of Ate hama, situated on a small sandy beach; and 1½ miles still further south the small bay and village of Iwagatami.

Djiono sima, a small island, joined to the coast by a reef of rocks, has a large tree on its southern end; and rocks extend one cable from its east point.

Tatsibana bay, immediately south of Djiono sima, affords anchorage in 8 fathoms, mud bottom, sheltered from all but easterly winds, when a heavy sea sets into the bay. A village is situated on a sandy beach at its head.

Naka no she, a dangerous rocky patch 1½ cables in extent, and with only 3 feet in its shoalest part, at low water, lies nearly 2½ miles E. by N. ¾ N. from the east point of Djiono sima.

Midzu no ko, a rock 13 feet high, and steep-to at half a cable distance, lies 8½ cables S.E. ¾ S. from Naka no she, and 2⁸⁄₁₀ miles E. ¾ N. from the summit of Djiono sima.

The COAST, from Tatsibana bay southward, consists of wooded cliffs bordered by rocks, none extending more than half a cable from the shore.

OOKADO POINT, the south-east point of Sozu sima, is a steep bluff point, on the top of which is a clump of trees. The point is formed by a long wooded ridge with two flat summits. Vessels may pass within 1½ cables of the point.

Funoko sima, a small but high islet, lies half a mile north-east of Okado point, and at low water is joined to the mainland of Sozu sima by a bank of sand nearly awash. In the bay formed on the north side of Funoko sima anchorage may be obtained in 11 fathoms, but open to the north-east.

SAKATÉ BAY, formed between Ookado point and Higiri saki, is 2¾ miles wide and 1¼ miles deep. The small island, Ko sima, lies close off the eastern shore of the bay, and anchorage may be had in 9 fathoms north-west of Ko sima off the village of Sakaté; or in 8 fathoms in the north-west part of the bay off the small village of Horikoshi. With S.E. winds, however, a heavy sea sets into this bay.

Fukube sima, a small islet 148 feet high, with a reef extending from its eastern point, lies one mile S. by E. from the south point of Higiri saki, and about midway between Ookado point and Djizo hana.

Higiri saki, the western point of Sakaté bay, is a small peninsula of moderate height and densely wooded; joined to the mainland of Sozu by a low wooded peninsula.

UCHI NO UMI, a magnificent and spacious harbour entirely landlocked, the entrance to which is between Higiri saki and Djizo hana, affords excellent anchorage for all classes of vessels in from 7 to 8 fathoms, mud bottom, in any part of the harbour. On the shores of the harbour are several large villages, the principal being Kusakabe. At the head of Uchi no umi are the small islets Benten sima.

Okino Hanake, a dangerous reef, the head of which only shows at low water, lies 3 cables S.W. from the north-west extreme of Higiri saki.

Djino Hanake, another dangerous rock, also only visible at low water, and on which are the remains of a beacon, lies 2½ cables N.N.W. from the same extreme of Higiri saki, and half a mile N. by E. ½ E. from Okino Hanake.

Tides.—It is high water, full and change, in Uchi no umi at 11h. 20m.; springs rise 6 feet, neaps 2¾ feet.

Directions.—Vessels entering Uchi no umi should pass westward of the above dangerous rocks, keeping at about 2 cables from the western shore with the summit of Sozu sima (O Shiga mine) well open westward of the point north of Higiri saki. When Benten sima opens clear of the same point the vessel may be kept away for the head of the harbour, which should not be approached nearer than 2 cables.

Supplies are not very plentiful, and though there are numerous wells on the island water is difficult to obtain.

DJIZO HANA is the extreme point of the high, steep, and conspicuous bluff terminating the peninsula that separates Uchi no umi from Ikéda bay.

IKÉDA BAY, on the west side of Djizo hana, is 4½ miles between that point and the peninsula of Ko sima, its western point. The greater part of the western shore of this spacious bay is filled with islets, rocks, and sand-banks, but anchorage may be obtained, if necessary, off the several small bights on its eastern shore; it is, however, not recommended, and is only available at any time for small vessels.

Ko sima, the south-west point of Sozu sima, is a peninsula at low water, but forms an island at high water, being separated only by an artificial canal; and on the shores of the narrow strait thus formed is situated the villages of Fti saki and Tonosho. The southern extreme of the peninsula of Ko sima can be approached to within a distance of 2 cables.

The WEST COAST of Sozu sima, northward from Ko sima, is bordered by a bank of sand and mud, which extends fully half a mile from the shore across the western entrance to the narrow strait leading to Fti saki as far as three islets lying off the north-west point of the island. Thence the coast trending E.N.E. for 5 miles to Ko sima has not been examined. From Ko sima it trends N.E. to Mioken hana, distant 1¾ miles; with 14 to 18 fathoms water at one-quarter of a mile from it.

OBÉ BAY is an open bay east of Mioken hana, on the shore of which are the villages of Tai Obe and Kobe. A group of islets and rocks connected by shoal water, lie off the western part of the bay with a deep water channel between them and Mioken hana. On the eastern side of the bay is the small wooded islet Ko sima, the south side of which is shoal; and there is a patch of 2½ fathoms in the middle of the bay, which, being so encumbered with rocks and shoals, is not a desirable anchorage.

Vessels, however, desirous of anchoring here should not attempt to pass between the islets and the shore of Sozu sima, and again should not approach the largest islet (O sima) within half a mile on its east side, as reefs extend fully that distance eastward from that islet. Entering, bring Ko sima to bear S.S.E. and steer for it until O sima bears West, when haul in for Obé mura and anchor in 3¼ fathoms.

A large group of islands lies in the northern part of the Harima nada, eastward of Sozu sima.

NISI SIMA, the most important of the group, is about 2 miles long (east and west), its shores being much indented, and forming on its north and south sides, bays where excellent anchorage may be had. The south-west part of the island rises in an elongated and slightly rounded summit (Otsutso yama) 925 feet high, a short distance northward of which is a conspicuous pyramid shaped rock. The island is uninhabited and uncultivated.

Ianghe sima is a small islet lying close off the east point of the southern bay (Oodomo ura); a patch of 4¾ fathoms lies 1½ cables S.W. from its south point.

Kita no Yanghe is a small islet lying off the west coast of Nisi sima, it is steep-to on its west side.

Inghé sima, an island about half a mile long, and of no great elevation, lies 9 cables west of Nisi sima, leaving a deep and safe channel between.

Takaba, Kanako, and Ko Matsu sima.—Southward from Inghé sima, a chain of islets and rocks extend 1$\frac{7}{10}$ miles, terminating in the small islet Ko Matsu sima.

MATSU SIMA GROUP.—The northern islet of this group of small islands lies 1$\frac{7}{10}$ miles south of Oodomo ura (Nisi sima), the whole group consisting of six islets, having several shoals in their vicinity. The islets Kadzura Kara, Ko Tsubura, O Tsubura, and Mitsuga shira are all steep-to on their western side, but vessels must not attempt to pass between them.

Deghizo no she, a dangerous patch of 4 feet, lies 4 cables S.W. from the south-west point of Matsu sima.

Oozo no she, a sunken rock, on which there is only a depth of 3 feet at low water, lies 3½ cables E. by N. ¾ N. from the north-east point of Matsu sima.

BOZE SIMA, joined to Nisi sima by a neck of sand about 50 feet wide, is of irregular outline, and its summit over the south shore is 328 feet high. On its east side is a bay, partly obstructed by a sand-bank and rocks, and on the north side, between the island and the east shore of Nisi sima, anchorage may be had in 10 fathoms.

The north point of Boze sima has a wooded peak which towers conspicuously above the ridge (also wooded); this ridge falls abruptly towards the sea from a thick clump of trees, and is useful as a mark to clear the sunken dangers lying northward of the group.

Uchi Shizumo, a sunken rock, having only a depth of 3 feet on it at low water, lies a little over half a mile W. ½ N. from the north (wooded) point of Boze sima, before mentioned. To pass westward of the rock keep the east side of Taka sima in sight through the gap between Nisi and Boze sima.

Taka sima, is a small island about 180 feet high lying southward of the sandy neck joining Nisi and Boze sima. From its summit the island slopes gently towards its north point, terminating in three pointed rocks from which a line of rocks extend northward one cable. A rock 26 feet high lies about 2 cables N.W. from the extreme north point of the island.

Ogo sima, a small islet, steep-to at one cable distance all round, lies 1½ miles east of Taka sima.

Kuro sima, an island 4 cables north of Ogo sima, forms in two humps connected by a flat ridge; on its eastern summit is a conspicuous tree. A small islet lies off its south-east side, and two smaller islets (having a reef between them) lie about one cable from its south-west part. A patch of 3¾ fathoms lies 2½ cables S.W. from the same point.

No sima is a small island, the summit of which is thickly wooded, lying a little more than half a mile N.N.W. from Kuro sima. Off its south point is a small islet (Adaka) connected to No sima by a reef; and from its east side two other islets connected by reefs extend about 4 cables.

IYE SIMA, an island 2 miles long, N.W. and S.E., lies half a mile N.E. of the north point of Boze sima, with deep water between it and No sima. On the north side of the island is a picturesque bay having at its head the villages of Ma ura and Mia ura, the latter being situated on the east shore of an inner harbour in the south-east angle of the bay, where small vessels may lie completely landlocked.

Simo and Kami Shizumo, are two dangerous rocky shoals lying $1\frac{2}{10}$ miles N.N.W. of the western point of Iye sima, the former having a depth of $2\frac{3}{4}$ fathoms on it, and the latter (2 cables E.N.E. from it) with only 4 feet over it at low water.

To pass southward of these dangers keep Kurakake sima in line with the north point of Iye sima, bearing E. ½ S. To pass northward keep the summit of Tanga sima in line with the same point bearing S.E.

TANGA SIMA, an island $1\frac{1}{2}$ miles across in every direction, has two summits forming a saddle between; its western peak 590 feet in height, being surmounted by a conspicuous clump of trees, and on its south point is a landslip showing as a white patch, conspicuous when passing southward of the island.

Tanga no Igari, a reef of rocks, one head of which only shows at low water, lies $1\frac{3}{4}$ cables East of the east point of the island.

Wa sima, two small islets joined together by a ridge of rocks which cover, lie 3 cables northward of the north point of Tanga sima. The passage between the island and islets is clear and deep.

Ka sima, two small islets connected by a reef, lie half a mile south of Tanga sima. A high pinnacle rock lies between them, and another pointed rock is situated on a point of the reef which projects one cable eastward of the northern islet.

Fta no sima, is a double islet connected by a low ridge. Shoal ground extends 2 cables south from the island, on the outer edge of which are two small rocky islets. Ftong no Icari is a reef of rocks always visible above water, lying 4 cables S. ½ W. from the islets south of Fta no sima; they are steep-to at one cable's distance.

Kurakaké sima, $2\frac{1}{2}$ cables long (N.W. and S.E.) forms in two hills joined by a low neck of land, the eastern being the highest, and its summit covered with brushwood. Off the west side of the island is a rock about 25 feet high. There is also a rock off the south-east side of the island.

Kami sima, the eastern of the group of islands in the northern part of the Harima nada, is covered with brushwood, and has rocks off its north and south points; and it should not be approached nearer than 2 cables.

ITSU BAY on the northern shore of the Harima nada (mainland of Nipon) in long. 134° 30′ E., affords good anchorage in 3 to 4 fathoms but quite open to the southward. Off the east point of the bay is a large isolated rock 25 feet high.

The COAST eastward towards Akashi strait has not been surveyed.

MOROTSU BAY* lies immediately westward of Itsu bay, is nearly 1½ miles wide between its entrance points, and one mile in depth, rapidly narrowing towards its head, where on the sandy beach, stands the village O ura. In a small bight on the east shore, south of O ura, is the village of Morotsu. The bay is quite clear of dangers, and has an even depth of from 4½ to 3½ fathoms all over it. On the east point of the bay is a small native light (lantern) for the use of junks.

Anchorage may be obtained in 3½ fathoms abreast the village of Morotsu.

Karami islets.—Off Morotsu bay are three small islets, the northern of which Okani Karami lying 7½ cables S.S.W. from the east point of the bay, has shoal ground extending nearly a cable from its north and east sides; and 2 cables E.N.E. from it is a reef of rocks, two heads of which uncover at low water.

The two southern islets, Nakani Karami and Okino Karami, are connected by reefs and should not be approached very closely.

Kimé sima, is a small islet lying 1¼ cables from the west point of Morotsu bay; in the channel between there is deep water, but vessels should not use it except in case of necessity.

OO URA, immediately west of Morotsu bay, is a narrow inlet indenting the coast in a northerly direction for a distance of 3 miles. It is one mile wide at its outer entrance but soon contracts to 3½ cables, opening out again into a spacious and sheltered sheet of water. At its head a narrow passage leads into a shallow basin, on the shores of which are the villages of Oo mura and Naba mura. There are two reefs, which always show above water, on the eastern shore.

Anchorage.—There is an even depth of from 4 to 3½ fathoms over the bay, and small vessels drawing less than 15 feet will find excellent anchorage in 3½ fathoms in the centre of the harbour, with the upper reef bearing S.E. by S.

Kazura sima, a small island, lies off the entrance of Oo ura half a mile from both entrance points. From its north point a spit of sand, which covers at high water, extends one cable northward.

SAKOSHI BAY, immediately west of Oo ura, is nearly one mile wide at its entrance (which is open to the south-eastward), and about a mile in depth. In the north-west angle of the bay is the town of Sakoshi situated in a small bight, off which is a wooded islet Iki sima. In the north-east angle of the bay is another small islet (Nabé sima).

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* *See* Admiralty plan :—Oo ura, Sakoshi, and Morotsu bays, No. 694; scale $m=2\cdot0$ inches.

On the low sandy extreme of the west point of the bay is a battery, 2½ cables south of which is a reef of rocks connected to the shore. There is an even depth of 3¾ fathoms over the whole of the bay and vessels may anchor anywhere as convenient.

Tides.—It is high water, full and change, at Oo ura at 10 h. 10 m.; springs rise, 5¾ feet, neaps rise 4¼ feet.

SINHAMA POINT and RIVER.—The coast from Sakoshi bay trends to the south-west for 1¾ miles to Sinhama point, on which stands a temple and large portico. The point is the southern termination of a ridge of hills about 700 feet in height which skirt the western shore of Sakoshi bay. There is a rock off the extreme of the point connected with the shore at low water, and 1½ cables S. ½ W. from it is a reef which dries at low water, having deep water between it and the shore.

Westward of Sinhama point the shore becomes low, and at half a mile forms several small islets, between which are the several channels through which the Sinhama kawa, a considerable stream, enters the sea. On the east side of its mouth are extensive salt works, and one mile up the river is the town of Ako formerly the capital of the province, and the towers of whose castle are conspicuous from the offing.

AKO BAY, is a shallow indentation open to the southward and eastward. Its western shore is formed by the east extreme of Kakuyé sima, which is high and thickly wooded.

Anchorage may be obtained in 3¼ fathoms, good holding ground, with the east extreme of Kakuyé sima bearing S.W. ¾ S. and Toréaghé E. by S. ¾ S., but better shelter will be found in either Oo ura or Sakoshi.

Toréaghé sima, a small wooded islet, surrounded by rocks, lies 1$\frac{2}{10}$ miles W. by S. ¼ S. from Sinhama point.

The COAST westward from Ako bay as far as Tsurumi peninsula, is lined with numerous islands, the channels between which are only navigable by vessels of small draught.

KAKUYÉ SIMA, the western of these islands, is 3½ miles long (east and west), varying in breadth from 2 cables to 1½ miles. Its shores form several indentions. The island is high and wooded, and quantities of deer are to be seen. The channel north of the island can only be used by boats.

Tsuru sima, a small island, near the summit of which is a temple gate, lies 4 cables from the south shore of Kakuyé sima. Off the north-east point of the island are two small islets connected to each other and Tsuru sima by a reef; and there is also an islet and shoal water off the south point of the island.

Kasira sima, an island 1½ miles westward of Tsuru sima, is separated from Kakuyé by a channel nearly 2 cables in width. The island is three-quarters of a mile long (N.W. and S.E.).

Rocks.—Off the east shore of Kasira sima are several rocks, the outer of which (Komé ishi) lies nearly 2 cables from the shore. One cable westward of the south point of the island is also a reef, and off its north-west point, in mid-channel, between the island and Ko O sima, are two reefs, the eastern of which has two high rocks on it.

Ootabo sima, an island half a mile in length (east and west) lies 1$\frac{1}{10}$ miles S.W. by W. from Tsuru sima and half a mile S.S.E. from Kasira sima. Its south and east shores are steep-to, but there are several rocks, all, however, above water, off its western shore. The north coast of the island forms a shallow bay.

NANGA SIMA, a narrow island 2¾ miles in length (E.N.E. and W.S.W.), is separated from the mainland of Nipon by a narrow and shallow channel only accessible to boats. The island is of moderate height, the summit, 292 feet high, being nearer its west end, and its shores are of very irregular outline, a low isthmus nearly dividing the island into two parts. On the south side of the isthmus is a small islet joined to the island by a sand spit, forming two shallow bays, in which are several rocky patches.

The channel between Nanga sima and Ootabo sima is clear of sunken dangers, and temporary anchorage may be had off the west point of the latter island in 4½ fathoms.

Ko O sima, nearly 500 feet high, and about one mile wide in all directions, lies immediately north of the eastern part of Nanga sima, from which it is separated by a channel only 1½ cables wide.

A rock which shows only at low water lies off the west shore, nearly half a mile south of the north-west point of the island.

So sima, about 300 feet high, one mile long (east and west), and about 2½ cables broad, lies immediately north of Ko O sima, separated by a narrow channel only navigable by boats.

TSURUMI PENINSULA.—The coast of Nipon from Ako bay is separated from the above-mentioned group of islands by a channel of an average width of half a mile, in which the depths vary from 3 feet to 3 fathoms. North-west from So sima there is a channel which leads into a spacious but shallow inlet, the south shore being formed by the peninsula of Tsurumi. This peninsula forms in two conspicuous summits, the western, of which 886 feet high, has a small clump of trees on it, the eastern being bare. Its southern shore forms with So sima, Ko O sima, and Nanga sima, a channel in which there is a general depth of 2¼ fathoms.

Nabé sima is a small round islet, the summit of which is crowned by a tree, lying close to the shore of Tsurumi peninsula, and west of the north point of Ko O sima.

A rock with 6 feet on it at low water lies W. ½ S. 6⅓ cables from the north point of Nanga sima, and almost in mid-channel between that island and Tsurumi.

Makutchi ura, a small bay on the mainland, is completely blocked up by mud, and there is a small reef of rocks within the points of the bay.

Djizo sima is surrounded by a reef of high rocks, which extend nearly one cable from its north side. Between the island and the coast there are depths of 1½ to 2 fathoms. A conspicuously large tree is seen on the southern slope of the island.

The COAST from Djizo sima trends S.E. to the north point of Shirimi bay (on the summit of which there is a large clump of trees). Tsino ura, a small bay half a mile deep, and with depths of 1½ to 2 fathoms lies between.

SHIRIMI UADA, a bay nearly 3 miles in length and one mile in width, indents the coast in a westerly direction about 3 miles west of Nanga sima; it is, however, so shallow as only to be available for small native craft.

Nezumi sima, a small islet surmounted by five trees, lies off the entrance to Shirima Uada.

Nabe buta, a large reef of rocks, a few heads of which are only visible at high water, lies 2½ cables E.S.E. from Nezumi sima. A shoal patch of 1½ fathoms lies one cable eastward of this reef, and between the islet and the reef is another rock with only 1¼ fathoms on it.

Shimo and Kami Ikada are two reefs not covered at high water, and lying from 2 to 3 cables off the southern point of entrance to Shirimi ura. Vessels should not attempt to pass between Nezumi sima and the shore.

PORT WUSIMADO,* on the mainland of Nipon, about 6 miles north of the western point of Sozu sima, is formed by a bay which, though in itself shallow, is fronted by a channel of deep water lying between it and extensive mud banks which extend westward from a small group of islands and islets lying off the bay. The harbour is not altogether easy of access as the channel is little more than 2 cables wide, shoaling suddenly on both sides.

Maé sima, an island 443 feet high, 2 miles long E.N.E. and W.S.W., and from one-quarter to half a mile broad, lies southward of the south point of Shirimi Uada, its eastern end being about one mile from the reefs of that point, and its north-western extreme approaching within 1¾ cables of the point on the mainland to the westward, on which is situated the town of Wusimado. A bank of sand and mud, with 6 feet water over it at low water, extend one mile west from the western extreme of Maé sima, and approaches within 3½ cables of a point of the mainland 1½ miles south-west of the town.

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* *See* Admiralty plan :—Port Wusimado, on sheet of plans No. 694; scale, *m* = 2·0 inches.

A bank also extends eastward from Maé sima towards Kami and Shimo Ikada reefs, leaving a narrow channel between it and a shoal bank extending from the shore of the mainland.

Oo sima and Ki sima are two small islands lying off the south and east shore of Maé sima. Between them are several rocky patches, and from the north-east point of the former, and the south-west point of the latter, shoal water and foul ground extends for about 2½ cables.

Kuro sima, another small island, lies 3 cables from the south-west extreme of Maé sima. Two small islets lie one and 2 cables respectively from its western side; and reefs, sunken rocks, and foul ground, extends westward for a distance of 7 cables.

Directions.—The entrance to port Wusimado is between the western edges of the shoals above mentioned (extending westward from Maé sima and Kuro sima) and the shore of the mainland, passing about 1¼ cables from the latter, and steering for Wusimado peak, 548 feet high, over the west end of the town, until the south point of Ki sima, opens clear of the north point of Kuro sima, when alter course to N.E. ¾ E. until the small hill over the west point of the town bears North, after which the south-east part of the town may be steered for and anchorage taken up as convenient in 9 fathoms at about 3 cables from the town wharves. A moderately long vessel should moor head and stern.

Tides.—It is high water, full and change, at 10 h. 15 m.; springs rise 6 feet, neaps rise 4½ feet.

PORT OKOYAMA,* the entrance to which is 4½ miles W.S.W. from port Wusimado, is in a narrow strait, 5 miles long, with an average width of about half a mile, connecting the Harima nada with a spacious landlocked, but shallow sheet of water, known as Amaki bay. The entrance to the strait is between Ishikiri point (on the north) and Komé saki (the former easily recognised by the conspicuous umbrella shaped tree which crowns the eminence immediately over it) and is here 7 cables wide. The navigable channel, however, soon contracts to, in some places, not more than 2 cables in width. About 1¼ miles within the entrance are two forts, one on either side, that on the southern shore being situated at the bend of the coast close to the village of Kogushi mura. From this fort the shore trends due west to Amaki bay, and the whole of the southern shore of the strait is backed by a high range of hills, culminating in rocky peaks, on the eastern of which, 919 feet high, is a conspicuous tree. Westward, the range is still more elevated, the rocky peak of Kin ko san (Kogamine yama) being 1,345 feet high. The northern shore of the strait is bordered by low land, a considerable portion of which has been reclaimed from the sea, and is protected by high substantial embankments.

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* *See* Admiralty plan :—Port Okoyama, No. 694 ; scale *m* = 2 inches.

Saidaidji gawa.—At 1½ miles from the entrance, on the north shore, is the mouth of the Saidaidji gawa, a river of some magnitude, which here enters the strait between high embankments. Extensive banks of sand which dry at low water, block up the greater part of the entrance on the eastern shore, leaving a narrow channel on the western side carrying 7 feet at high water.

Hi gawa, the mouth of which is about 4½ miles from the entrance to the strait, is a much narrower stream, but has a greater depth of water on its bar. Small steamers and junks ascend it as far as Fuku sima mura (where there is a custom house), and moor off the wharves in about 6 feet water.

Okoyama, is a large town containing about 200,000 inhabitants, and is the chief town of the province of Bizen, and formerly the residence of a Daimio; it is also an important commercial centre.

Také sima, is a small wooded islet, lying about 8 cables eastward of the entrance to the Hi gawa; it is situated in the centre of an extensive mud flat, which extends from its east and west shores, but its south point on which is a temple, can be closely approached.

Aiga she, on which there is a depth of only 1¾ fathoms at low water, lies nearly 4 cables N.W. from Ishikiri point, and is the only danger in navigating the strait. Vessels should pass westward of this rock, keeping the high rocky western summit of Inu sima (the largest of the group) open of Iskikiri point.

Hato sima, is a small islet on the northern shore, about three-quarters of a mile westward of the channel into the Saidaidji gawa.

Rock.—S. ½ E., 3 cables from Hato sima (on the north edge of the channel) is a reef which covers at high water.

Directions.—Entering port Okoyama steer to bring Kogushi fort to bear N.W., and proceed for it on that bearing until Komo saki bears South, when haul up N.N.W. ¼ W., steering to pass in mid-channel between the two forts; and when the temple on the south end of Také sima opens clear of the south shore of the strait steer to the westward, keeping at about 1 cables from the south shore.

Anchorage may be taken up as convenient in from 6 to 9 fathoms but there is only room for a small vessel to swing at her anchor.

Tides.—It is high water, full and change, at 10 h. 15 m.; springs rise 6 feet, neaps 4¼ feet. The tidal streams are very strong in the strait; after heavy rains the ebb stream attaining a velocity of 5 knots an an hour.

Channels between the HARIMA NADA and BINGO NADA.—Westward of Sozu sima the Seto Uchi is studded with numbers of islands, for miles forming numerous channels, of which the most central and southern only have for the most part been examined; these however are sufficiently clear of dangers to be with ordinary caution quite safe; and the surveys of these narrows now render the navigation of the Seto Uchi comparatively easy.*

Taka sima, an island covered with brushwood, lies 3¼ cables from the projecting point which forms the northern limit of Tsuda bay; it is bordered by rocks except on its north side, where there is a spit of sand and shingle.

Oki no isso, a reef of rocks which uncovers at low water, lies 2½ cables north-east from Taka sima. The reef is 2 cables in length (north and south) and one cable wide, and its centre lies with the west extreme of Ino sima, in line with the tuft of trees before mentioned as situated westward of the sharp wooded summit of Dino yama. At a distance of half a cable from the reef in all directions there are depths of from 13 to 15 fathoms, mud bottom.

TSUDA BAY, formed between Ounobe yama and a mass of high land, 1,000 feet in height, which trends in a northerly direction, is 1¾ miles in width, and on the sandy beach are situated the villages of Tsurua and Tsuda, the former at the foot of a hill (Hi yama) surmounted by a clump of trees. Tsuda is a large town situated between two rivulets. The sandy beach at the head of Tsuda bay is steep-to, there being a depth of between 2¾ and 3¼ fathoms at low water, at one cable from it. A cultivated valley extends from the beach to the foot of the hills situated behind Tsuda. A series of small hills lie northward of Tsuda and extend towards the mass of high land which skirts the western shore of the bay.

Saruko sima, a small islet joined to the coast by a shingle spit, lies W.N.W. of Taka sima and N.N.E. from the north point of Tsuda bay. At 1¾ cables N.E. from the islet is a reef on which is a remarkable pinnacle rock, joined to the coast by a bank of sand and mud, on which are depths of from 6½ to 8 fathoms.

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* *See* Admiralty plan:—Channels between Bingo nada and Harima nada, No. 128; scale *m* = 1·5 inches.

Tides.—It is high water at Tsuda mura at 11 hrs. 50 min.; springs rise 6½ feet; neaps rise 2 feet. The prevailing winds sensibly influence the times of high or low water.

Anchorage. — Tsuda bay affords excellent anchorage, sheltered from all winds except those from N.N.E. to E.S.E., which send in a heavy sea. The best anchorage is in from 5¼ to 6 fathoms, at from 5 to 6 cables off the sandy beach on which the town is situated; with the summit of Kinu (Nao) sima bearing S.E. by E. ¾ E. Small vessels will find anchorage in from 3¾ to 4½ fathoms at 3 cables from the beach.

Directions. — Coming from the northward, and bound for an anchorage in Tsuda bay, the passage between Taka sima and the coast should be avoided. To pass eastward of Oki no isso, bring the western of the two clumps of trees, which surmount the two neighbouring bluffs close to Dino yama, in line with the east extreme of Ino sima; this mark leads direct for the anchorage, and clears all dangers.

The COAST, from Saruko islet, trends to the northward, forming two cliffy points, with a sandy beach between them. Thence northward is a bluff off which, at a distance of 1½ cables, are depths of 4 and 4½ fathoms. Westward of the bluff is a small bay in which anchorage may be obtained; at its head is a small village on a sandy beach, terminating northward in a cliff off which are several rocks, and northward of which is another sandy beach. Westward of the cliff terminating the last mentioned beach the coast is rocky, trending to the north-west as far as Oda point, the eastern point of Oda bay.

ODA BAY, between Oda and Kanobe points, is 2 miles in width, and about the same in depth, the shores gradually approaching each other. The village of Oda is situated on a sandy beach, at its head, between two bluff points, on the eastern side of the western of which, close to the village, are two moles affording shelter for junks. This bluff which is of a dark colour is conspicuous when entering the bay; rocks extend a short distance from it. On the northern side of the bluff is another sandy beach, on which is also a village, and close to it are also two other moles forming a sheltered anchorage for junks.

Oda point terminates in a steep cliff at the foot of the north extreme of the mass of land 1,000 feet high separating Oda from Tsuda bay, and off it is a large high rock resembling a man's hand. The point should not be approached within a distance of two cables. A tongue of sand and mud, having on it depths of from 6 to 10 fathoms, projects from the centre of the head of the bay in a N.N.W. direction, having on each side depths of from 15 to 20 fathoms.

Anchorage may be had in Oda bay at its head on the above-mentioned bank in from 7 to 9 fathoms. Small vessels may anchor closer in, in from 4 to 6 fathoms N.N.W. from the dark wooded bluff and westward of a detached rock on the east shore of the bay.

The western shore of Oda bay, northward of Oda eastern bluff, is composed of alternate wooded bluffs and sandy beaches ; on the beach next north of Oda is a large building surrounded by white walls, near a grove of trees, the beach joining a hilly point, on the slopes of which are several houses. The hill terminates to the northward in a long wooded point, the extreme point of which is a bluff of moderate height, and westward of which, on a sandy beach, is a village and junk harbour. Coming from the eastward pass Oda point (the east point of the bay) at a distance of 2 cables, and steer for the small peninsula on the west coast, until the wooded bluff of Oda bears S.S.E., when anchor as before directed. Entering Oda bay from the westward pass at about 4 cables from Okusi no hana, and after rounding it at that distance steer for the wooded bluff which will lead up to the anchorage before indicated.

HANAM URA, between Kanobe point and the peninsula of Goken san, is an extensive inlet 2¼ miles wide at its entrance and 3¼ miles in depth. The inlet is divided into two bays, Naga hama ura and Sido ura, by a peninsula, the extremity of which forms in a hill 260 feet in height (Kogo Sino hana, and terminates in a low projecting point to the north-west. Eastward of this point is a reef extending over 2 cables from the shore, and a small islet lies 2 cables E. ½ N. from the point.

Naga hama ura.—The western shore of this bay is formed of a series of cliffs which continue for about one mile into the bay, whence a sandy beach extends to the westward to Kogo Sino hana, forming the head of the bay. The Kabé gawa, a considerable stream, during the rains, flows into Naga hama ura; on the beach eastward of its entrance is a small village with sheltered cambers for junks between it and the entrance to the Kabé gawa. Naga hama ura, at its head is bordered by a bank of sand and mud (having depths of from 1 to 2½ fathoms on it) to a distance of 3 cables ; there is a depth of 5 fathoms in the centre of the bay at three-quarters of a mile from the beach.

Sido ura, the other western bay of Hanam ura, is shallow at its head, depths of from 2 to 3 fathoms extending over a mile from the beach, on which is situated the village of Sido. On the east side of the town is a large temple* surrounded by trees forming a thick clump, conspicuous from the bay, and another temple is situated on a spur (from the hills which surround Sido ura) westward of the town. The western shore of Hanam ura is formed by a succession of cliffs, terminations of the slopes from Goken san range, separated by sandy beaches, on several of which are small villages.

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* The temple contains some very remarkable bronze statues.

A bank of sand and gravel, 7 cables long (east and west) and 5 wide, with depths of from 3¼ to 5 fathoms over it, lies nearly midway between Kanobe point and the western shore, at the entrance to Hanam ura.

Anchorage.—Large vessels will find good anchorage in 8 fathoms (mud bottom) midway between the entrance points of Naga hama ura; with Kanobe point (the eastern point) bearing N.E. by E., and the extreme point of Kogo Sino hana S.W. by W. Vessels drawing less than 16 feet may anchor closer in, or may anchor in Sido bay in 21 feet at low water, with the large temple clump of trees bearing S. by E. and Kogo Sino hana N.E.

Tides.—It is high water, at Hanam ura, at 11h. 15m. Springs rise 5¾ feet; neaps rise 2 feet.

Directions.—Vessels of heavy draught entering Hanam ura should be careful to avoid the isolated bank, before mentioned, as lying nearly in the middle of the entrance, and should therefore pass at 4 cables from Kanobe point, and steer in for the summit of Kogo Sino hana bearing S.S.W.

Taka sima, a small island half a mile long (north and south) and about 1½ cables across, lies three-quarters of a mile off the western shore at the entrance to Hanam ura. The island, which is about 130 feet high, is thickly wooded, and its northern and south-western points are low and covered with trees. Shoal water extends 2½ cables westward from its north extreme, and from 1 to 1½ cables, north and eastward from it. Uneven depths of from 7 to 22 fathoms are found in the channel between Taka sima and the shore.

Goken san, considered a sacred mountain, is a very conspicuous rocky peak 1,260 feet in height, towering above the other peaks of the chain of hills which border the western shore of Hanam ura. On the same range southward of Goken san are two summits about 820 feet high, and to the northward of Goken san are four knobs or summits, one of which, 790 feet in height, is surmounted by a very conspicuous clump of trees.

Ara hama, a small peninsula separated by a low neck of land from the main spur from the Goken san range, forms the north-west termination of the high land westward of Hanam ura. A large high rock, lies off the point, situated on a reef which extends half a cable from the shore.

Kaganu se, a bank of sand and gravel with depths of from 3¼ to 4¾ fathoms on it, extends in a N.N.E. direction from Ara hama for a distance of half a mile. The tide forms violent eddies over this bank.

O-KABUTO, KO-KABUTO, and INAGHI, form a group of small islands which, together with O-sima, a larger island, lie off Ara hama.

O-Kabuto, 3 cables long (north and south) by 2 cables broad, has at its north end a large high rock surmounted by a tree in the form of an umbrella. On the south-east side of the island a small beach, bordered by trees, and on which there are a few houses, joins a long rocky point which uncovers at low water for a distance of one cable in an E.S.E. direction.

Two rocks, which cover at spring tides, lie 2¼ cables eastward of the northern point of the island. Southward of these rocks shoal water extends for 4 cables, the shoal joining the island of O-Kabuto, and extending the same distance eastward of the island. The tidal streams set with a velocity of 4 knots an hour over this bank, and in the wake of the rocks there is usually a long tide rip.

Ko-Kabuto sima lies 2 cables S.S.E. from O-Kabuto, the channe between being deep. The shores of the island are cliffy, except on the south side where there is a small sandy beach.

Inaghi sima lies 6 cables S.E. from O-Kabuto ; its summit forms in three humps when viewed from the westward, and the island is covered with brushwood. An islet with a long flat ridge, and a large rock westward of it, lies off the west side of Inaghi ; from these a rocky reef extends in a W.S.W. direction for a distance of one cable.

Eastward from Inaghi a bank of sand and gravel, with depths gradually deepening from 1½ to 10 fathoms, extends in a south-east direction for half a mile.

Oo Sima, or San shio Osima, an island nearly a mile long (north and south) of irregular shape, lies 6 cables south-west from Ko Kabuto sima, ts southern part being composed of high wooded hills joined by a low wooded ridge of less elevation to a wooded bluff which forms the northern point of the island. From the south-west point of Oo Sima rocks extend a short distance, terminating in a small high rock, to the south-west of which is a small bluff connected to the island by a low isthmus. The south-west point of this bluff uncovers for a distance of half a cable, and depths of from 3¾ to 4¾ fathoms extend in a south-west direction for a distance of 6½ cables. Three islets lying westward of Oo sima are joined to that island by a bank of sand and gravel having shoal depths over it. Yakada, the middle of these three islands, is the largest.

Sou no we.—A bank of sand and gravel, the head of which uncovers at low water spring tides, extends from the east shore of Oo sima nearly across to Ko Kabuto sima, completely obstructing the passage between the islands.

Directions.—Vessels passing between the above mentioned islands and the peninsula of Goken san can do so in safety by keeping in mid-channel until abreast the south shore of Oo sima, when a course W.S.W. should be shaped to pass southward of Meki sima. Vessels of heavy draught must be careful to avoid the bank extending N.N.E. from Ara hama.

TABLE BAY is a shallow bight 1½ miles wide at its entrance and 2½ miles deep, immediately westward of Ara hama. It is so called from the table land (800 to 1,000 feet in height) which forms its western shore and terminates northward in a wooded bluff, on which is a battery. A reef, on which is a small rocky islet (Ya sima), extends one cable westward of the battery point, and three detached rocks lie to the eastward close off the coast. The table land falls steeply on its south side. At the head of the bay is the entrance to a stream which communicates with the salt works at Takamatsu.

Table bay is completely blocked by a shallow bank of sand and mud, and affords no shelter or facilities as an anchorage.

TAKAMATSU BAY.—From Ya sima the coast falls back to the southward for 2 miles, and then extending in a westerly and north-westerly direction for 6 miles forms an extensive bay, in the centre of which is situated the town of Takamatsu.

The eastern part of the bay dries a considerable distance from the shore at low water, shoal water extending over a mile from the coast in some places. Extensive salt works line the whole shore from the village situated under the table land (before mentioned) to the town of Takamatsu.

Takamatsu is the chief town of the province of Sanuki, and was formerly the residence of a daimio, whose castle towers and pagodas are conspicuous from the offing; it contains about 200,000 inhabitants. On both sides of the town are the entrances to considerable streams spanned by bridges, and there are several boat cambers along the sea face of the town. Several streams enter the bay westward of the town, the land being protected by a sea wall. The bay is shallow, depths of less than 5 fathoms extending in several places (one being immediately north of the east end of Takamatsu) one mile from the shore.

Anchorage.—Good anchorage may be had inside the shoal off the large town of Takamatsu, or indeed anywhere between Ya sima and Ohara no hana in 6 and 7 fathoms, sand and mud bottom, at about one mile from the shore. The tides are, however, very strong at this anchorage, and with strong westerly winds and ebb tide (springs) running there is a heavy sea, across which a vessel will ride very uneasily.

Directions.—Great caution should be used in approaching this anchorage southward of the islands above described. The best channel is south of Inaghi and Ōo sima, (taking care to avoid the shoal spit from the southern shore lying between these islands), and passing Ya sima give the shore south of it a berth of one mile to clear the shoal bank which lies S.W. by W. ¼ W. 7 cables from it.

OKI SIMA, 2¼ miles to the north-westward from the north point of Ō sima, is about a mile long (N.N.E. and S.S.W.) and less than half a mile in width; it has two wooded summits, both of which are about 600 feet high, that to the south being sharp, while the northern is flattened at the top. From its eastern shore a shoal bank extends a considerable distance to the eastward with a patch of 2½ fathoms 5 cables from the shore, between which and it, there is another shoal bank. To the eastward of the former patch the water gradually deepens from 6 and 7 fathoms.

MEKI SIMA, lying south of Oki sima, from which it is separated by a narrow channel less than 4½ cables wide, is nearly 2 miles long N.N.E. and S.S.W., and half a mile wide; its summit over the south point being 722 feet high. At half a mile from its eastern shore a long shoal bank extends nearly parallel with the shore, the northern extreme of which is E. ½ S. 1½ miles from the north point of the island. The western side is also shoal, off its centre extending three-quarters of a mile.

Kama se.—From the south point of Meki sima a shoal bank (Kama se), with 1 and 2 fathom patches upon it, extends to the westward nearly parallel with the shore, which it completely bars for a distance of 5½ miles, to Ohara no hana; with 7 and 8 fathoms between it and the shore of Sikok.

ODE SIMA, lies between Sozu sima and Te sima at one mile from the south-west point of the former; it is small, about 400 feet high, and wooded. From its north point a bank of sand and mud extends 1¼ miles N.N.E., with depths of only 1½ and 2 fathoms on it; and from its south-west point a shoal bank (2½ and 3½ fathoms) extends 8 cables from it towards the south point of Te sima.

Awari sima, a rocky islet with a wooded summit, lies 6 cables South from the south-west point of Ode sima. Vessels should not pass to the northward of this islet.

Bank.—A bank having depths of 7 to 9 fathoms on it, with 12 to 19 fathoms alongside, lies 1½ miles southward of Ode sima, a little north of the track taken by steam vessels passing through the Inland sea; it is about 2½ miles long east and west, and half a mile wide. Strong eddies are formed on this bank.

TÉ SIMA, a large island about 3 miles long east and west, lies northward of the route recommended, and is steep-to along its south shore. The island rises steeply to a height of 1,112 feet, the summit, Danno yama, being in about the centre of the ridge, which extends east and west through the middle of the island.

Té sima bank.—A shoal extends nearly one mile from the shore 1½ miles to the westward of the south point of Té sima; there are several patches of 2¼ fathoms on the north edge of this bank within a distance of 3½ cables from the shore, outside which the general depths on the bank are from 3 to 5 fathoms.

NAO SIMA, the next large island to the westward, lies 1½ miles from the shore of Nipon, between which there is a deep and safe channel. It is 2½ miles long N.W. and S.E., and is surrounded by small islets.

KASIWA, an islet off the southern point of Nao sima, is immediately north of the route through the channels; it is steep-to on its south side.

Koo sima is the south-western islet lying off Nao sima, between that island and the shore of Nipon. Several rocks lie southward of this islet, the most southern being Okake rock, 5 feet above water, South of Koo sima.

NAKA SE, an extensive shoal bank extending from the south-west shore of Oki sima 3½ miles in a W. by S. direction, is to the southward of the route. No-o saki should not be brought open southward of Koduchi in approaching this bank; when in line with the south end of Koduchi it leads north of Naka se.

The COAST of Nipon, from Nao sima, approaches the shores of Sikok to within 3¾ miles, it being the narrowest part of the Seto Uchi. The northern shore (province of Bizen) westward from the above island about 6½ miles in a direct line to Kusumi no hana has not been examined.

Galatea shoal,* (Ozono sé) with 1½ to 3 fathoms on it, is 1¾ miles in length, east and west. Its eastern extreme lies 1½ miles W. ½ S. from the south point of Kasiwa, and its western extreme approaches Odutsi within one mile. The south point of Kasiwa island in line with the south end of Te Sima bearing E. by N. ½ N. leads one-quarter of a mile southward of the Galatea shoal.

ÖDUTSI (Cone island). This island is very conspicuous from all directions, appearing perfectly conical with smooth sides which, however, are really covered with dense brushwood; its summit is 540 feet above the sea.

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* H.M.S. *Galatea,* Captain H.R.H. the Duke of Edinburgh, grounded on this shoal in 1869.

KODUCHI (Kodutsi), a somewhat similar island, 350 feet high, lies 1$\frac{2}{10}$ miles south of Odutsi; between is a deep water channel through which is the usual route taken by vessels passing through the Inland sea. A ledge extends one cable from the north shore of Koduchi.

The coast of Sikok westward from Takamatsu towards Ohara no hana forms two small bays, both of which are filled with mud banks. At the head of the eastern are some salt-works.

OHARA NO HANA, one-quarter of a mile from the south end of Koduchi, is a bluff point, bordered by cliffs, the hill over which is quite bare; in the channel between there is deep water. Passing through this channel care must be taken to avoid the Assa rock, and also the extensive shoal (Kama sé) before mentioned, extending eastward from Ohara no hana as far as the south end of Meki sima.

Assa rock, with 15 feet on it at low water, lies E. ¼ N. 6½ cables from the northern point of Koduchi; it is steep-to all round. No-o saki in line with the south end of Koduchi bearing W. by S. ¾ S., leads 1½ cables southward of this rock.

NO-O SAKI lies 1¾ miles W. by S. from Ohara no hana, between which are two bays. Over the point which separates these bays is a wooded peak, 770 feet high, showing of conical form when seen from the northward. On the eastern side of No-o saki are two very conspicuous landslips.

Anchorage may be obtained in either of the two bays between Ohara no hana and No-o saki, the eastern being, however, preferable, as the water does not shoal so far out. The best berth in this bay is westward of a line joining Odutsi east point with Koduchi west point, in about 7 fathoms; with the north end of Oki sima in line with Ohara no hana bearing E. by N. ½ N., and the east end of Odutsi bearing N. by E. ½ E. If anchoring in the western bay take up a berth in the centre of the entrance in about 6 fathoms, but not nearer in than to have Nabae sima lighthouse in line with No-o saki.

Ko Sei sima, 2½ cables long east and west, and 140 feet high, lies 2 miles W. by S. from No-o saki. A ledge of rocks extends half a cable from its western point, and there is shoal water 3 cables from its eastern extreme. The northern side of the island is steep-to, and as Ko sei sima lies directly in the track of vessels passing south of the Conqueror bank, they should always pass northward of this island.

Sei sima and Shami sima, the former of which two islands lies 6 cables to the southward of Ko Sei sima, is about 7 cables long north and south, by 5½ cables broad, its summit, near the centre, being 360 feet in height. The latter island (Shami sima) lies 1$\frac{1}{10}$ miles westward of Sei sima, is 5½ cables long (north and south) and very narrow, its summit, over the north end, being 104 feet high. These two islands are joined to each other by a sandbank, which dries in many places at low water. A shoal bank also extends 2 miles to the south-west from the south point of Sei sima, leaving a channel half a mile wide between its southern edge and the Sikok shore.

SANMEN SIMA (Three rocks), a cluster of rocky islets from 25 to 30 feet high lie a little over one mile north of Shami sima, immediately south of the route through the channels. The two northern rocks are joined at low water, and they are all steep-to everywhere but on their western side.

Three rocks spit.—A narrow bank of sand, shells, and gravel, with from 2 to 5 fathoms on it, extends 6 cables westward from the above mentioned three rocky islets, towards Siyako. It may be crossed in 10 fathoms by keeping Odutsi its own breadth open of the lighthouse on the small round island, Nabe sima, off the south point of Yo sima.

Coming from the eastward through the Inland sea, the Sanmen sima group divides two channels which may be used. That to the northward of the rocks and Usi sima, through the St. Vincent channel (north of the Conqueror bank), though the narrowest is preferred, it being the deepest. The channel southward of Sanmen sima, Usi sima, and the Conqueror bank has, at low water, a depth of only 3¾ fathoms.

YO SIMA, an island about half a mile in extent, lies 4½ cables to the northward of Sanmen sima, between which is a deep channel; the island is cultivated and wooded, with a village on its south-east side.

Ko Yo sima, a narrow islet, lies 2 cables from the east shore of Yo sima, nearly parallel to it. Between the two islands there are several shoal patches.

NABE SIMA, a small islet about one cable in extent, lies immediately off the south-east point of Yo sima; it is steep-to on its south side.

LIGHT.—From a lighthouse 30 feet high situated on the summit of Nabe sima, is exhibited, at an elevation of 85 feet above the sea, a *fixed* white light of the fourth order, seen from seaward between the bearings of S. by W. ¼ W. (through West and North) and E. ¼ S.: it should be visible in clear weather from a distance of 12 miles.

SIYAKO ISLAND lies one mile west from Yo sima, with a deep channel between; it is 2 miles long N.E. and S.W., high and comparatively bare, its ridges, elevated over 600 feet above the sea, being sandy and covered with short grass in patches; there are several villages on its southern shore which is steep-to except off its south point.

Siyako ledge.—A rocky ledge extends 1½ cables off the south point of Siyako, at the outer part of which is a rock, with less than 6 feet water on it. Heavy overfalls are generally seen there.

Clearing mark.—Habushi iwa (Ten feet rock), its own length open of the north end of Takami, leads between Siyako and Usi sima, clear of danger.

Tides.—It is high water, full and change, at Siyako at 0h. 16m.; springs rise 9½ feet, neaps 4 feet. The streams run regularly six hours each way, the flood setting to the westward, and the changes take place about an hour before the end of the tide. The tides, however, are sometimes irregular.

USI SIMA, lies to the southward of Siyako, between which is a deep channel, 5 cables wide. The island is thickly wooded, with two clumps on its summits (the northern being 340 feet high), which are very conspicuous when approaching it.

Rocks, which dry towards low water, extend one cable off the north point of Usi sima; they are steep-to.

THE CONQUEROR BANK.*—From the south-west point of Usi sima a shoal bank extends 2¼ miles in a W.S.W. direction towards Takami. It is a narrow ridge of sand and shingle, with knolls and patches on it of 1¾ and 2 fathoms, and is nowhere more than 3 cables across. Both its northern and southern edges are steep-to, the deeper water being on its northern side.

Clearing mark.—The north end of Ödutsi (Cone island), in line with the south end of Sanmen sima, bearing N.E. by E. ½ E., leads south of the Conqueror bank; and the west extreme of Ote sima, in line with the west end of Habushi Iwa, bearing N.W. by W., clears the west end of the bank, in 5 fathoms.

HIRO SIMA, lies 1¼ miles westward of Siyako, the channel between being nearly filled up by an extensive sand-bank. The outline of Hiro sima is very irregular, and its sharp rocky ridges are very conspicuous. The summit of the island (over the south point), presents southward the appearance of an almost perpendicular cliff, and is 990 feet above the sea. On the south shore is Ino ura, a small bay, on the shores of which are several small villages, the valleys around being cultivated. The eastern hills are covered with brushwood, but the western ridges are thickly wooded. In the ravines, the sides of which are rocky precipices, deer are found.

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* H.M.S. *Conqueror* grounded on this bank in 1864, on the occasion of Admiral Kuper's squadron passing through the Seto Uchi.

Anchorage.—Ino ura is a convenient anchorage for vessels passing through the Seto Uchi, and is generally chosen as a night anchorage, especially when bound from Hiogo to the westward, it being within convenient distance, and can be arrived at before nightfall. Care must be taken not to approach the shore too closely, as the head of the bay shoals very suddenly; the northern end of Takami, just touching or shut in with the south point of Ino ura will avoid this bank, but particular care must be taken only to just close the channel and not to shut in Takami too much. Good holding ground will be found here out of the strength of the tides.

Habushi iwa (Ten-feet rock), lies 5½ cables S. by E. ½ E. from the south point of Ino ura; it is 20 feet high and whitened, and may be passed quite safely on either side at one cable distance.

TAKAMI, a very conspicuous island on the south side of the route through the Inland sea, is nearly 1½ miles long (N.W. and S.E.), lofty, and has a sharp ridge through its centre, the whole of which is thickly wooded, forming on its south end a conspicuous clump 990 feet above the sea. Two villages are situated on its south-east side, and it is the undisturbed resort of pigeons, which are to be found in great numbers.

Shoal.—A shoal bank extends from the eastern side of Takami in an E.N.E. direction, and nearly joins the south-west extreme of the Conqueror bank. There are, however, two narrow channels between the two. By keeping Habushi iwa bearing N.N.E. will lead, in not less than 4½ fathoms at low-water, 3½ cables eastward of the bank (of 2 fathoms) off the east side of Takami. The leading mark for the other channel is the same as that given above for clearing the western edge of the Conqueror bank. Between these two channels is a small patch of only 3¼ fathoms.

SANAGI SIMA, lies 3 miles W.S.W. from Hiro sima, is 1½ miles long north and south, and about half a mile wide; and its centre peak, which is wooded, is 815 feet above the sea. On its south-east side is a large village with a camber, affording good shelter for native craft.

Ko sima (Round island), lies half a mile east from the south end of Sanagi, its sides are smooth and steep, and its summit is 480 feet high.

North bank. — From the eastern shore of Sanagi sima joining Ko sima, and extending 3 miles in an easterly direction from the former island, is an extensive bank of sand, with from ½ to 2 fathoms upon it; its eastern extremity projecting slightly into the St. Vincent channel. In passing this bank, vessels should not shut in the clump on Siyako with the south point of Hiro sima (*see* page 399).

NEZUMI SIMA, a small islet about 1½ cables in extent, lies 1¾ miles to the southward of Sanagi sima, and 2¼ miles W.S.W. from Takami. Between Sanagi (on the north) and Takami and Nezumi (on the south) is the channel generally used by vessels passing through the Inland sea, carrying 6 fathoms water. The islet, 63 feet high, and of a brown colour, is surrounded by rocks, which project on its northern side to nearly 3 cables. It would be advisable, therefore, under any circumstance, to give it a berth of half a mile. Hahushi iwa in line with the north extreme of Takami bearing E. by N. ¾ N. leads 3 cables northward of the rocks off the north end of Nezumi sima.

From the western shore of Takami an extensive bank having patches of 1¾ and 3 fathoms upon it, extends in a W.S.W. direction towards Nezumi sima. The shoalest spot (1¾ fathoms) lies W. by S. ¼ S., 1¼ miles from the south extreme of Takami, and there is deep water immediately south of this patch.

Clearing mark.—The summit of Te sima, in line with the east point of Ko sima bearing N. by E. ½ E., leads in 4½ fathoms between Nezumi sima and the shoal (1¾ fathom) patch. The north point of Mutsu sima, in line with the western end of Nezumi sima, leads 2 cables to the southward; and the south point of Usi sima, in line with the south end of Takami bearing N. by W. ¾ W., leads to the south-eastward.

MUTSU SIMA, an island half a mile in extent, 610 feet high, with a village on its east side, lies 4 miles W. ½ N. from Nezumi sima, and 2½ miles N.N.W. from Akeno misaki. In the channel between it and the cape, through which lies the main navigable route, there are depths of 14 to 20 fathoms. Rocks, which cover at high water, lie nearly half a mile from the west shore of Mutsu sima.

The St. VINCENT CHANNEL, to the northward of the Conqueror bank, lies between the islands above described (commencing from the eastward with Yo sima), and has on its north side the islands of Siyako, Hiro sima, Sanagi sima, and Ko sima, and on its southern side the rocky islets Sanmen sima, Usi sima, the northern edge of the Conqueror bank, and the extensive bank nearly joining it (extending from the east side of Takami), and Nezumi sima; together with the shoal between Takami and the latter. In the centre of the channel, off Hiro sima, is Habushi iwa (Ten-feet rock), before described.

Directions.—Harima nada to Bingo nada through St. Vincent Channel. Keep as nearly as possible to the track shown on the Admiralty chart which leads in about mid-channel between Djizo hana (the south point of Sozu sima) and Kanobe point (on the Sikok shore), whence a N.W. by W. course, allowing for the set of the tides*, will pass at from three-quarters of a mile to one mile north of the small island of O Kabuta. When the south extreme of Kasiwa sima is seen clear of the north point of Oki sima (the next island westward from O Kabuta) bearing W. ½ N., alter course to W. by N. to pass the north point of Oki sima at about 4 cables distant. On rounding this island the conspicuous cone-shaped island Odutsi will be seen open clear of Kasiwa, bearing about W. ½ S.; steer W. by S. to pass about half a mile southward of it, or mid-channel between it and the small island Koduchi southward of it, taking care to keep Rocky point, the south point of Te sima (immediately north of Oki sima), a little open southward of Kasiwa (the small island off the south-east point of Nao sima), bearing E. by N. ½ N., until Ödutsi is passed, by which means the Galatea shoal on the north side of the route is avoided, as well as the extensive bank Naka se, which lies to the south of the route, extending 3½ miles westward from Oki sima.

When in mid-channel between Ödutsi and Koduchi, the wooded island Usi sima with its two conspicuous clumps will be seen bearing W. by S. ½ S., and in line with it the rocky islets Sanmen sima, immediately north of which Nabae sima lighthouse will be seen appearing as if situated on the south point of Yo sima. Alter course to W. by S. ¼ S. to pass in mid-channel between the lighthouse and the small islets (Sanmen sima) southward of it, passing No-o saki at about a mile, and the small island Ko sei sima at about three-quarters of a mile to the northward. From mid-channel between the islets (Sanmen sima) and Nabae sima lighthouse, steer for the clump on Siyako until Habushi iwa (Ten-feet rock) is seen in mid-channel between Siyako and Usi sima, when haul to the southward and bringing its south extreme its own width open of the north point of Takami bearing W. by S. ¾ S., steer for it. This mark leads clear of the rocks off the north end of Usi sima, and also the ledge off the south point of Siyako, and through the St. Vincent channel north of the Conqueror bank. Having passed these dangers Habushi iwa may be passed on either side at one cable, and the north point of Takami at the same distance, taking care to keep the north point of Usi sima in line with the north extreme of Habushi iwa (astern) to clear the North bank, which extends 3 miles eastward from Sanagi sima towards Hiro sima. This mark leads about 2½ cables north of Takami, the north point of which island is steep-to. After passing Takami steer W. by S. ¾ S. with the clump on Siyako island in line with the south extreme of Hiro sima (astern). This mark will lead between Sanagi sima and the rocks north of Nezumi sima in 7 fathoms. Care must be taken on no account to shut in Habushi iwa with Takami.

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* In this part of the Seto Uchi, *i.e.* from Sozu sima (in the Harima nada) to a short distance westward of Mutsu sima (in the Bingo nada) the tidal streams take the direction of the channels through which the route lies, the flood stream setting to the westward and the ebb to the eastward.

The northernmost clump of trees on Usi sima, in a line with the north point of Takami, is also a good mark, and leads in 7 fathoms between Nezumi sima shoal, and the shoal bank of 4 fathoms extending southward from the island of Sanagi; and in mid-channel between Mutsu sima (to the northward) and Akeno misaki (the extreme point on the Sikok shore), into the Bingo nada. This route (northward of the Conqueror bank) carries the deepest water through the channels connecting the Harima nada with the Bingo nada.

The Channel southward of the Conqueror bank.—This channel was formerly the route used in navigating these narrows previous to our recent surveys, but it is now very seldom made use of. If however it be desirable to use this channel, on passing between Odutsi and Koduchi steer W.S.W. to pass about one-quarter of a mile south of Sanmen sima (the rocky islets before mentioned), after which steer to the south-westward to bring the summit of Ödutsi midway between these islets and Ko sei sima, bearing N.E. by E. ½ E.; and with this mark continue on, steering S.W. by W. ½ W. When the south-west extreme of Hiro sima comes in line with Habushi iwa (Ten-feet rock) bearing N.W. ¾ W. the vessel will be on the eastern edge of a shoal bank stretching right across the channel, and on which the depths vary from 3¾ to 5 fathoms. Cross this bank keeping the same marks on (astern), and when Nezumi sima is seen open of the south point of Takami, the water will shoal to 4¼ fathoms, and when the summit of Ko sima (Round island) comes in line with the north-east point of Takami,* the vessel will be abreast, and to the southward of a patch of 3¾ fathoms. When the south end of Nezumi sima comes in line with the north extreme of Mutsu sima bearing W. by N. ¼ N. haul up W. ¼ N. to pass about 2 cables northward of the north point of Awa sima, after passing which steer West to pass between Mutsu sima and Akeno misaki.

The COAST.—From No-o saki the coast of Sikok takes a south-westerly direction for 14 miles to Ko-ya no hana. Westward of the islands Sei sima and Shami sima, before mentioned as connected to the shore by shoals, it is skirted by a shoal bank extending in some places more than one mile from the shore, and opposite the town of Marugame as far off as the two islets Kami-ma sima and Simo-ma sima. The shore is an extensive plain on which are several towns and large villáges, the largest of which are Sakaide, Marugame, and Tadotsŭ, the two last being the residence of Daimios. To the eastward of the former are the mouths of the Ahyano kawa, a river of some dimensions; and on the coast fronting the town are extensive salt works. Both at Sakaide and Marugame there are small tidal junk harbours. At 2 to 3 miles inland the mountain ranges attain an altitude of over 1,000 feet, and beyond them are seen the higher ranges of Sikok towering above them to about 10,000 feet above the sea.

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* These mark the position of the 3¾ fathom patch.

Tadotsŭ has a small tidal harbour for junks and small craft. The town is small, clean, and flourishing, and manufactures a great deal of basket work, for which it is famous. About 1½ miles eastward of the town is the mouth of the Makasii gawa. Southward of the town the hills approach and skirt the coast rising to a considerable altitude, the highest (Mi Tatte yama) being a wooded peak 1,420 feet in height.

The COAST from Ko-ya no hana takes a north-westerly direction for 6½ miles to Akeno misaki, between which are several shallow bays; the whole forms a narrow promontory, the hills in the centre being low and wooded, whilst those toward the cape and those inshore are about 1,000 feet high.

Sisi sima, a small island 328 feet high, on which there are two villages, lies N. by E. 1¼ miles from Ko-ya no hana. In the channel between are depths of 5 to 7 fathoms.

AWA SIMA lies between Ko-ya no hana and Akeno misaki on the south side of the southern channel; it is triangular in shape, having bays on its north, south, and west sides, and appears like three islands joined by two narrow, low, sandy isthmuses, the extremes being high and wooded. There is a large village on the south side. Off the south-west point of Awa sima is a rock awash at low water, one cable from the point.

Awa rock, 2¾ cables long in a W. by S. and E. by N. direction and one cable broad, with 7 to 12 feet water on it, lies on the south side of Awa sima 3½ cables S.W. by S. from the south-east point (nearest part) of the island. Depths of 4½ and 5 fathoms are found near the rock.

Anchorage may be obtained in either of the above bays in Awa sima, that to the south having the deeper water; but the northern bay is more convenient for vessels anchoring for the night. Care must be taken not to anchor too near the head of the north bay as it shoals a long way out. This may be avoided by keeping Nezumi sima just open of the north point of Awa sima, and the islet Simo-ma sima just open of the eastern point of the bay. The bay on the west side of the island is shoal.

Tides.—It is high water, full and change, at Awa sima at 0 h. 7 m.; springs rise 10½ feet, neaps about 6 feet.

AKENO MISAKI, situated on the Sikok shore at the eastern boundary of the Bingo nada, is a prominent cape, thickly wooded, rising gradually by a succession of small peaks to Shiwoonde yama 1,130 feet high, a bare mountain on the summit of which is a large clump of trees, conspicuous from the eastward or northward. A small rock about 20 feet high lies just west of the cape, which is steep-to, and may be passed at a distance of 2 cables.

THE BINGO NADA, from the channels just described across to the channels leading into the Misima nada, is about 30 miles wide, and about 38 miles long in a N.N.E. and S.S.W. direction. It is comparatively clear, having only a chain of six islands stretching across it in a N.W. and S.E. direction, and a few others lying near the Kurusima strait.

TOMO,* is a town on the north shore of the Bingo nada, on the mainland in about lat. 34° 22½′ N., long. 133° 23½′ E. It is famous for its *sake* (native spirits) distilleries. There is a harbour here for small vessels, protected by piers at the entrance and sheltered from the southward (in which direction the harbour is open) by a pier which extends east from Tamatz sima, and forms a breakwater.

Tamatz sima, a small islet, lies 2 cables south of the entrance to Tomo harbour, and 1¼ cables from the shore. A pier projects from the shore towards the islet.

Anchorage.—There is anchorage in 5 fathoms in the roadstead sheltered from north and west winds.

MUSTU SIMA, is 610 feet high, and cultivated to its summit; two rocks, that show like fishing boats at low water, and cover at a quarter flood, lie nearly half-a-mile to the westward of this island.

UDSI, has two peaks 370 feet high, that to the east being double and wooded.

HASIRI, is a large island having two peaks, the eastern 400 feet high, the western 200 feet.

The chain of islands above mentioned as lying in a N.W. and S.E. direction 2¼ miles from Akeno misaki, are,—

TOYO, in the fairway from the Wu sima channel, has a double peak on its eastern end, 300 and 250 feet high, falling to a flat on the west, of 100 feet elevation.

TAKAIKAMI, OKI, and YENO, form a conspicuous group. Takaikami has a single peak 800 feet high; Oki, three peaks of 530 feet elevation with a small islet south of it; Yeno, one peak, 200 feet high.

MATA SIMA, MOMO, and IBUKI,—The former is about 100 feet high, small, round, and has a few conspicuous trees on it. Momo appears barren and has three small nobs on it, the highest of which is about 150 feet. The latter island is about 100 feet high and bluff at the east end with a few trees on it, from which it gradually slopes to the west end. The other group above mentioned as lying near the Kurusima strait consists of,—

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* *See* Admiralty plan:—Tomo roads and harbour, No. 770; scale $m = 5\cdot8$ inches.

KADJI SIMA, 264 feet high, to the eastward of O sima, is a round double-topped island with a red cliff on the hill side north of the summit, and may be approached to 2 cables all round.

MIOJIN SIMA, makes in three lumps, the highest having a clump of trees at the summit, 325 feet above high water. The east brow has a single tree. The island has a deep bay on the south side, with a few fishermen's huts, and is steep-to all round.

Nezumi sima is a small round island with detached rocks that just show at high water, one cable off the south point.

SHI-SHAKA SIMA, consists of two islands, the higher a grass covered hill 501 feet high, falling steeply on the west side. The north and lower island has a clump of trees near the summit, and is joined to the higher by a shingly beach, at the north end of which is a village.

HIKI SIMA, is a group of four islets, lying S.W. by W. ½ W., 5 miles from Shi-shaka sima, the eastern islet being surmounted by a conspicuous chimney-shaped clump 57 feet high and 242 feet above high-water. From the east point of the largest islet rocks extend half a cable, the two western being small pinnacle islets, 96 and 30 feet high.

Ajika rock, awash at high water springs, lies E. by N. ¾ N., ode mile from the south-east point of the eastern Hiki sima islet, and from it S.W. ½ S. 1½ cables is another rock awash.

HEJI SIMA, are two islets, 2¼ miles south from Hiki sima and are three-quarters of a mile in length, the western and higher having a clump of trees at the summit, 309 feet above high water. S.S.E., three-quarters of a mile from the west point, lies a peaked rock, 30 feet above high water, and N.W. ¼ W. 1½ miles from Heji sima there is a sand-bank with 22 feet least water.

Through the BINGO NADA.—On passing Nezumi sima, steer to pass in mid-channel between Mutsu sima and Akeno misaki, from whence, if wishing to take the northern route through the channels between the Bingo nada and the Misima nada, a course W. by N. will lead up to mid-channel between the islands of Hyaku Kuan and Yoko, at the entrance to the Mekari seto.

If intending to take the southern route through Kurusima strait, a course W.S.W. from Mutsu sima will lead up to Takaikami, the loftiest of the islands above described as lying in the Bingo nada; and, passing in mid-channel between it and Oki sima, continue the same course passing about one mile north of Kadji, the northern island of the next group, and when the islets of the south point of Ō sima are seen, haul up and steer to pass them at about a mile, for Kurusima strait.

KURUSIMA NO SETO (Kurusima strait).*—The northern shore of the province of Iyo forming the southern coast of the approach to Kurusima no seto, may be known by two curiously shaped hills, one with a double summit, on one of which is a clump of trees 1,202 feet above high water; the other hill has a lower clump, 363 feet above high water, close to the shore, 2¾ miles south of Imabari, the coast being composed of a series of sandy beaches, between Imabari and the spurs from the double hill just mentioned. The large town of Imabari is also very conspicuous on this shore, and the islets off the south point of Ō sima on the northern side of the strait are also easily recognized.

IMABARI, is a large town, the residence of a Daimio, whose castle is situated behind the trees and pier, south of the town. There is a camber, but it dries to the mouth at low water. Anchorage, though in a strong tideway, may be had with off shore winds, in from 11 to 13 fathoms, sandy bottom, good holding ground, with the pier bearing S.S.W. distant 2½ cables.

Rocks that cover at high water, and stretch 1½ cables from the shore, lie off the coast N.N.W. ¼ W. 1½ miles from the pier at Imabari.

Tori ishi, a rock with a temple gate on it, 13 feet above high water, lies nearly 4 miles south-eastward from Imabari pier, and 1½ cables from the shore.

Ōbama, is a large village 2¼ miles to the north-west of Imabari, having a bluff point at the north extreme, and a conspicuous temple gate near the centre.

Hirosé, several rocky patches, some of which dry at low water, lie from one to 2 cables from the foot of the bluff point.

Shiroi iwa, 13 feet high, is a white topped rock, lying 2½ cables N. by E. ½ E. from the rocky point just northward of the village of Ōbama, and may be approached to within a distance of half a cable on the east side.

Amaze, a rock that dries at low water, lies N. by W. ½ W., 3½ cables from Shiroi iwa.

Ō SIMA, a large island on the north side of Kurusima no seto, bears evidence of volcanic origin in the remarkable features of its innumerable peaks, deep valleys, and off-lying pinnacle rocks. The highest hill, Nimbutsgata or Tomari yama, is grass covered, and surmounted by two conspicuous trees 1,270 feet above high water. It falls steeply on the north side, and terminates at the north-west point in a conical summit, from which it is separated by a deep valley extending from Tomari ura.

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* *See* Admiralty plan:—Kurusima no seto, No. 131; scale $m=6$ inches; and channels between Misima nada and Bingo nada, No. 132; scale $m=1\frac{1}{2}$ inches.

The south shore falls steeply from a succession of high sharp peaks: Tate yama, Kiro yama, Takatorisan (surmounted by a clump), and Tōdai yama (granitic), covered here and there with small trees. The north shore, forming the south side of Karé seto, has no remarkable feature, is cultivated a short distance from the shore, and has several villages scattered along it.

Miya no ura, is a large sandy bay on the north shore of the island, with a considerable village along the beach, east of which, and forming the north-east point of Ō sima, is Tōdai no ōsaki, terminated by a cliffy islet (100 feet high), steep-to.

Tsuk ura.—On the west side of Ō sima is the deep bay Tsuk ura, shallow to the outside of pinnacle rocks in its entrance, off which rocks awash extend one cable north-west and south-east.

Kamage, lying S. by E. ½ E. 7 cables from Tōdai no ōsaki, is a pinnacle rock that may be approached to one cable.

Yoko sima, a bare island, steep-to on the south side, lies S. by W. ¾ W. 1¼ miles from the same point.

Tsukumo no sima, a small islet with a round clump of trees at the summit, lies W.S.W. 1¼ miles from Yoko sima; a sand-bank extending half a cable off the north point, that dries at low water.

Reef.—At three-quarters of a mile E.N.E. from Tsukumo no sima is a reef that dries 4 feet at low-water, with shoal water extending half a cable from its west extreme.

Ōbasan and **Riugon,** are two islets lying off the south-west point of Ō sima, the latter and outer being 32 feet high, and having a large tree on its summit.

More no iso, two white rocks, which lie a quarter of a mile East from Riugon, are joined at low water, and are 5 and 3 feet above high water. The tide races and whirls round these rocks with great velocity. They should not be approached nearer than 1½ cables.

TSU SIMA, a wooded island, with two summits showing from north or south lies half a mile from the west shore of O sima off the south side of Tsuk ura; it has off the west side a small islet joined at low water, having a tree at its summit; and farther north a bluff peninsula that makes as an islet when seen from a short distance. The island is steep-to, except on the south-east side, from which, separated by a narrow channel, lies a flat cultivated island (Ozukuma), having rocks that extend half a cable from the south point. A black rock covered at high water, and joined to the flat island at low water by a sand-bank, lies West two cables from the north point.

UMA SIMA, has two summits, the southern and higher 290 feet high, and covered with scattered trees. From the south point, 150 yards, lies a rock awash, over which the tide ripples with great force. The east side of the island is foul for half a cable; and off the islet at the north end, rocks and shoal water extend North, one cable.

NAGATO SIMA, lying 2½ cables eastward of Uma sima, is round, wooded, and steep-to on the west side, and may be approached to half a cable on the north or south.

O no se, a rock that dries at low water, lies East three-quarters of a cable from the east point of Nagato sima.

MUSHI SIMA, lying about 2½ cables north-east of Nagato sima, consist of four wooded islets, the two southern joined at low water; the northern joined to them by rocks awash.

Bushiro, a rock having a depth of 13 feet on it, steep-to all round, lies E.S.E. 2 cables from the east point of Mushi sima.

NEZUMI SIMA, lying half a mile to the north-west of Uma sima, is a cultivated island 6½ cables long, about 3 cables broad, and 356 feet high, rising to a wooded summit, and having a clump of trees on the west slope. The east side is steep-to, and its south-west point forms a narrow isthmus joining a high wooded bluff to the main part of the island.

From the south-west point, two rocks that just cover at high water, stretch out a short distance, and may be approached to a quarter of a cable. A bank of shoal water also extends 8½ cables to the north-west of Nezumi sima, having on its outer edge 4 to 4½ fathoms, with several patches of rocks awash, and of less than six feet, between its outer edge and the island.

Shiroi iwa, a white rock, 25 feet high, lies near the middle of this bank, and a patch of rocks, having 3½ fathoms at low water, lies N.W. ½ W. 7½ cables from Shiroi iwa.

Ko no se, or Perseus rock, three granite boulders, having a depth of only 4 feet on them at low water, and steep-to all round, lie E. by N. 1½ cables from the north-east point of Nezumi sima.

KURU SIMA, small and wooded, 150 feet high, with a steep fall at the north end, and a village on the east and west sides, lies in the entrance of Hashi hama, 2½ cables from the south-west point of Nezumi sima. Shoal water extends half a cable from the north point, but the mid-channel between it and Nezumi sima is clear.

HASHI HAMA, is a deep inlet, but shallow water extends 7 cables from its head, filling up the greater part of the bay; a large village is situated on the south-west shore, and a granite lantern on the north-east. Off the north-east point there is a shoal of 6 feet distant three quarters of a cable. There is no anchorage here owing to the continual whirl of tide; but vessels set in by the tide may round Kuru sima at half a cable.

HANGATA.—From Hashi hama the coast trends to the north-west to Ozumi no hana, and about midway between is the village of Hangata, near the north end of which is a temple gate.

Anchorage. — There is good anchorage off Hangata, north of Hirosé, in 7 fathoms, distant 2½ cables from the shore, with the south extreme of the village bearing S. by W. ¾ W.

There is no really safe anchorage off Obama or Imabari, the tides being especially strong there.

Hirosé, is a ledge of rocks covered at high water, lying 1¾ cables from the beach, off Hangata. Both this rock and Maru iso are occasionally marked by tree beacons.

Maru iso, a rocky patch, lies 8 cables N.N.W. from Hirosé; S.E. ½ S. half a mile from Ozumi no hana; and 1½ cables from the shore, and uncovers 5 feet at low water.

OZUMI NO HANA, the north point of the province of Iyo, is a low point falling from a hill with a large clump of trees 419 feet high, and forms the western boundary of Kurusima strait. Off it, and separated by a channel passable by boats, is a grassy mound 35 feet high, outside which, and joined to it at low water, is a flat rock, 3 feet above high water; and inside two white rocks, 13 feet above high water. The outer flat rock may be approached to 2 cables. The tide ripples are very strong here.

Directions.—Approaching from the eastward.—The channel between Nezumi sima and Uma sima (Ko no seto) is the best, and that known as the Kuru sima or Junk channel, is not recommended. After rounding Uma sima, care should be taken to clear the Perseus rock, by keeping in mid-channel, with the eastern point of the entrance to Hashi hama harbour open of Nezumi sima, until a remarkable single tree in the first gap south of the highest sharp hill (Kiroyama) on Ō sima, is in line with the north extreme of Mushi sima bearing S.E. by E. ½ E. The northerly stream sets on to the south-east point of Nezumi sima, and also towards the Perseus rock.

Approaching from the westward, after passing Kadjitori saki, a course should be steered to pass a quarter of a mile north of the flat rock off Ozumi no hana, when the conspicuous tree, in the first gap south of Kiro yama, will be seen in line with the north extreme of Mushi sima, bearing S.E. by E. ½ E. This mark should be kept on until the west extreme of the north-east point of Hashi hama is open east of Nezumi sima bearing S.W. ¼ W.; this clears the Perseus rock (Ko no se). A course may then be steered to pass west of Uma sima, borrowing rather nearer to that island than the mainland, to avoid the Amaze rock.

Uma sima may be rounded at 2 cables, or continuing the leading mark a little farther on, a course may be steered to pass between Uma and Nagato sima (Nagato no seto), keeping the latter island close on board.

Caution.—The other channels should not be attempted.

Tides.—In the Kurusima no seto, from Ozumi no hana the flood stream sets towards Nezumi sima and Tsu sima, sweeping over the Perseus rock (Ko no se) towards the north point of Uma sima, then taking the direction of the channels, diverging into the Hi-uchi nada. The ebb converges from the last-named place to the channels, running with great velocity from Imabari to the north, so that a vessel leaving that place should guard against being swept on to the More no iso. From the south point of Uma sima it sets towards the south-west point of Nezumi sima, and diverges through the channels. The ebb sweeps directly through the channel between Uma and Nagato sima, causing on the north side heavy whirls that must be guarded against, their tendency being to turn the vessel's head towards Ko no se. The velocity at springs is from 4 to 6 knots.

It is high water, full and change, at Hangata at 10h. 36m.; springs range 11½, neaps 5 feet, after superior transit of moon, and at 9h. 52m. springs range 9, neaps 3½ feet, after inferior transit.

KADJITORI SAKI lies S.W. by W. ¾ W. nearly 3 miles from Ozumi no hana; it is a sharp promontory, steep-to, the northern boundary of a deep bay, with several villages round its shore. In the centre is a bluff point, Nigi no yama, lying E. by N. ½ N., 2 miles from Ka sima.

Idsuye sima, are conical rocky islets in this bay S.W. by S., 3 cables from Nigi no yama, and from the same point a rock that never covers lies S.W. by W., 7 cables, and W. by N. ⅓ N., 4¼ cables from Idsuye sima.

Obe Hato ura.—There is an excellent anchorage in this bay in from 6 to 8 fathoms on a flat of sand and mud not nearer than 2 cables from the shore. The point of Nigi no yama must not be brought to bear northward of East.

A rock that dries at low water, lies in the bay between Kadjitori saki and Ozumi no hana, one cable from the shore.

Ka sima, is a round island with reefs extending 1½ cables from the east side.

Adji rock, lies W. ¾ S. 1½ miles from Ka sima, and 8 cables from the mainland of Sikok, between the villages of Segarta and Kikuma.

Heso sima, is a pinnacle islet close to the shore. From it, N. ½ E. nearly a mile distant, lies a shoal of 15 feet.

Kikuma, is a large village whence great quantities of fir branches are exported for use in the salt manufactories. A considerable river, spanned by a bridge, runs through it and enters the sea just west of a small hill with cliffy face to seaward, on the summit of which is a temple dedicated to Hachiman. The deposit from this river has formed a sand-bank, the outer edge being 2 cables from the shore.

The COAST.—From Kikuma the coast of Sikok to the westward as far as the narrows between the Misima and Iyo nadas has been surveyed, but thence to Mi saki, at the entrance to the Boungo channel, has not been examined ; from the soundings obtained some distance from the shore it would appear to be shallow of approach. (For continuation of mainland of Sikok *see* p. 428.)

The NORTHERN ROUTE through the Mekari seto and Aogi seto is but little greater distance than through Kurusima strait, if when off Mutsu sima a course be at once steered for its entrance through the Mekari seto ; and it has the advantage of the Kurusima strait from the fact that the tides are of much less velocity here than in the latter.

Directions for MEKARI SETO. — Passing northward of Hyaku kuan at about 7 cables a course N.W. by W. ¼ W., with the bluff fall of Hachi gaune yama (which will be seen ahead 1,405 feet high) in line with the right extreme of Hoso sima, will lead into the Mekari seto clear of Jarrad bank which lies to the northward off the south-east point of Mukai sima. On passing Hoso sima at about 2 cables distance and northward of the *red* and *black* beacon on Chodaiu rock, borrow on the northern shore which is steep-to until abreast Ko saki sima, when keep in mid-channel between Saki sima and the coast of Nipon until within half a mile of Ko-ne sima, when the Aogi seto will open; then haul up S.W. by W. ½ W. and bring the distant high peak Higashi (on Osaki sima) in line with the extreme point of Ō-mi sima; this mark will lead in mid-channel between Admiral and Captain banks. On nearing the dark wooded island Kuno sima a rocky islet will be seen off Ō-mi sima which may be passed at 1½ cables. Keep in mid-channel between Matsu sima and Ō-mi sima, rounding the buoy (*see* page 415) moored off the rock and foul ground lying north of Kodono sima, when steer to pass in mid-channel between Yoko sima, Niwatori jima, and the shore of Osaki sima until abreast Noka no hana (the south-east point of Osaki), when haul up and pass in mid-channel between Oge and Ko Oge sima into the Misima nada. (For directions from the westward, *see* page 417.)

HYAKU KUAN, an island about 2 cables in length N.W. and S.E. with a grass covered conical hill, 237 feet high, has steep cliffs around, except on the north-west side, from which a bank of shingle extends 2 cables, steep-to on the outer edge. Half a cable from the south-east point there is a rock awash.

Between this island and Yuge sima there is a bank of mud, shoaling gradually, the least water 5 fathoms, lying W. by N. ½ N., 2 miles from Hyaku kuan. This bank affords excellent anchorage, except off the channel between Yuge and In no sima, where the water is deep and tides strong.

YUGE SIMA, consists of two parts, the north-eastern having high wooded ranges faced by cliffs and with steep falls, with three peaks; the eastern being 1,077, the centre 1,030, and the western 954 feet above the sea.

The south-west part is granitic and bare, with a conical summit 463 feet high. These high parts of the island are joined by a low cultivated plain on which is situated the village of Ige mura at the head of a bay, where good anchorage may be had in 6 to 9 fathoms, sandy bottom. The south point has rocks and shoal water extending a little more than a cable off it, and the north point has foul ground extending off it for 2 cables.

IN NO SIMA, lying north-west from Yuge sima, is a high wooded island, forming the south-west side of the Mekari seto and having several remarkable hills, the summit 1,268 feet high, being a table land, steep on the south-east side, and falling on the other sides to ridges which extend in a north-westerly direction, on each side of a richly cultivated valley.

On each side of the north end of this valley is a bare granitic hill, the eastern, Take yama, 764 feet high, having a fine temple, dedicated to Kanon, at its summit. A large village lies between the bases of these hills, and surrounding a round wooded hill, 452 feet above the sea, that shows out well against the bare ranges in the background.

The south part of this island has a conical hill covered with scrub, from which a spur stretches to the eastward, forming the south side of Mitsu-no-tsu, that affords good anchorage for a small vessel.

The channel between Hoso sima and this island has a bank of shoal water stretching across its eastern entrance to Shi-ziu-jima, (conical islets off the north side of In-no-sima). From them the coast runs to the south-east to a point where a fort has been built. From the fort the coast trends into a deep bay, in the centre of which are two conical wooded islets joined together at low water, and at the head of the bay is a wall, the outer margin of reclaimed land. South of this bay the coast is bold and steep, ending in an islet with a tree higher than the rest at its summit. This islet forms the north point of Mitsu-no-tsu. A small bay, Koyo, south of this, terminates at the entrance of Nagasaki no seto.

YOKO SIMA, on the north-east side of the Mekari seto, is 856 feet high. The island has not been surveyed. Off its south-west point is an islet, Ategi sima, appearing in two lumps when seen from the southward, and is steep-to on the west side. N.W. ¾ W. 2 miles from the west point lies a rocky patch having 2¼ fathoms least water. The outer margin of 5 fathoms bears W.N.W. from this point.

MUKAI SIMA, a large island lying 3 miles north-west from Yoko sima, has bare granitic hills, the highest a cone of 933 feet, being surmounted by a remarkable single tree. Off its south point is the islet of Sasajima, and N.W. ¼ W. 7 cables from this islet is a rock close to the shore, on which is a broken down beacon that just shows at high water.

Jarrad bank, an extensive patch with rocky knolls of 2½ and 3 fathoms, lies to the south and west of Yoko-sima saki, the south-west point of Mukai sima, from which it is separated by a deep channel nearly 3 cables wide. Its outer edge lies S.S.E. 8 cables from the above-mentioned point.

IWASHI SIMA, an island about one mile in extent, is separated by only a very narrow channel from the west shore of Mukai sima; it has high granitic ranges, about 400 feet high, surmounted by dark boulders, the two northern hills showing conspicuously. It is steep-to on its west side. Both Mukai and Iwashi lie on the north side of the main channel (Mekari seto).

HOSO SIMA, a wooded island, 8 cables long (N.E. and S.W.), lies about 3 cables north-west of In no sima, and half a mile south-west of Iwashi sima, the route through the Mekari seto lying between it and the latter island. Its north-east point is sharp and bare terminating in a bluff, surmounted by two conspicuous trees, and is steep-to.

Matsu sima.—South of Hoso sima, separated by a channel of 1½ cables, lies Matsu sima, densely wooded: a sand-bank that dries, extends one cable from its west side.

Sukune sima, a round wooded islet, steep-to all round, lies 8 cables westward of Hoso sima, and East half a mile from the east point of Kosaki sima. A sand-bank that dries one foot at low water, nearly 2 cables wide by 5½ cables long, lies east of this island.

Haka no kojima, a rocky peaked islet, with trees on it, lies to the southward of Sukune sima, and has reefs all round extending one cable.

Chodaiu, a rock covered at low water, and steep-to, lies E. by N. ¼ N., a little more than a mile from Sukune sima; and W. by N. ¾ N., nearly 4 cables from the north-east point of Hoso sima.

Beacon.—A conical granite beacon, 17 feet in height, surmounted by a globe, and coloured *red* and *black* in horizontal bands, has been erected on this rock.

SAKI SIMA, a large island 2½ miles long (north and south) and 1½ miles broad, lying half a mile westward of the north-west shore of In no sima, shows in contrast to the former island, by having bare granitic ranges, running in sharp spurs to the shore, and forming in three summits, the two highest being of nearly the same elevation (811 feet), the third and northernmost, an isolated conical hill.

Sato iwa.—A rock with a stone beacon on it, 5 feet above high water, lies three-quarters of a cable from the west point of Saki sima; and is steep-to on its outer sides.

Nearly the whole of the channels between this island, Ko-ne sima, and In-no sima, are blocked up by patches of shoal water.

Ko saki sima, a small island, 6½ cables long (N.E. and S.W.), 3 cables broad, and 233 feet high, lies north of Saki sima, separated by a channel of 1½ cables, in the centre of which is a reef. It has a double summit of disintegrated granite; and the north shore must not be approached within half a cable.

KO-NE SIMA, separated from the south-west shore of Saki sima by a channel 7 cables wide, lies at the junction of the Aogi seto and the Kuruma no seto; it is about 2 miles long (north and south) and one mile broad, with a high wooded range about 800 feet high, extending along its entire length, falling gradually towards the north but steeply to the south, with cultivation reaching a considerable distance up the slopes. A remarkably deep ravine runs in from the small bay on the north side, dividing the range into two spurs. The north side of the island is steep-to.

Captain bank, off the west side of this island, having 13 feet shoalest water, lies a quarter of a mile from the shore, the outer extreme of 5 fathoms lying half a mile beyond it.

MAIN-LAND of NIPON.—From the entrance to Onomichi no seto on the west side of Iwashi sima, the shores of Nipon trend W. by S. ¾ S., to a point immediately under Hachi-gaune yama, and then takes a north-westerly direction to the village of Matsu hana, above which is a steep bluff. From this bluff a mud flat that dries at low water, and is nearly steep-to, stretches S.W. by W. ¼ W. to the opposite shore of the large bay of Miwara, the western extreme of which is the steep bluff Kaino.

MIWARA.—On the east shore of this bay, a castle, the residence of the Karo, a white building, shows most conspicuously, at the foot of wooded hills, partially cultivated up their slopes. The large town of Miwara lies inshore of the castle.

Anchorage.—There is excellent anchorage off Miwara, in from 10 to 5 fathoms as convenient; but a long vessel (to avoid the extensive mud flat at the head of the bay) should not shut in the north point of Ko-ne sima, with the point west of the bay S.S.W. ¾ W., or the single tree on the summit of Mukai sima, with the point beyond Matsu hama E. by S. ¼ S.

From Kaino bluff the coast trends S.S.W. ¼ W. for 2 miles, when it takes an abrupt turn, and as far as the east point of Tadanomi bay has a general direction, S.W. by W. ½ W. for 3¾ miles.

Tadanomi.—In the bay of Tadanomi is a rock, marked by a stone beacon about 5 feet above high water, lying W. by N. 3 cables from the east point. Anchorage may be had off this village, but in deep water and quite close to the shore; it should only be used in case of emergency, as the bank is very steep. From Tadanomi the coast trends W. ½ N. to the island of Ta-no bashi which is joined to the main-land by a sandbank that dries. From this island the coast trends W. ¾ S. to the small village of Taka saki situated under the eastern slopes of a conical hill fringed by trees, from which the coast runs along the base to the town of Takewara forming the northern shore of Aogi seto.

ADMIRAL BANK, lies on the northern side of the Aogi seto abreast the village Noji ura on the main-land of Nipon above described; its outer edge being about 6 cables from the shore. Its south-east extreme lies S.W. 7 cables from the east end of Uwa sima, a small islet eastward of Noji ura. The bank from this point takes a W. by S. ¾ S. direction, towards the summit of Kuno sima, to which it approaches within 2½ cables. The largest patch of from 2 to 3 fathoms lies abreast the village above mentioned, and two other patches lie 1½ miles nearer Kuno sima, the whole bank having depths varying from 2 to 6 fathoms upon it.

KUNO SIMA, an island one mile long (north and south), lying 3 miles westward of Ko-ne sima, is wooded, and wedge-shaped when seen from east or west; the highest part, about 500 feet, being near the north extreme, which is terminated by a conical islet about 20 feet above high water.

Ko kuno sima, lying 3½ cables west of Kuno sima, is a dark wooded islet, with a dome-shaped summit, terminating in a precipitous bluff to the northward, steep-to.

Matsu sima, is a small double-topped islet, 2 cables in extent, and is steep-to all round.

The channel between Ō-mi sima, and the islands of Matsu sima, Kuno, and Ko-kuno sima is deep outside one cable from the shore. On the south shore of this channel are two conical hills, the west grassy and peaked, the east surmounted by a clump of trees.

ABA SIMA, to the north-west of Matsu sima, makes in two peaks when seen from east or west, the highest being a dark wooded hill at the south end about 400 feet high; but when seen from the south makes as a wedge, the highest part being to the eastward. The south side of this island is steep-to.

Aba sima rock.—Off the west side of this island are two shoals. The western having a depth of 10 feet on it, lies S.W. ½ W., 5¼ cables from the north-west point of Aba sima; and the eastern with 13 feet water on it, lies S.S.W. ½ W., 3 cables from the same point.

Aba sima flat.—Off the east side are two sandbanks; the eastern occupying a space of 2½ by 2 cables, dries at low water, and its outer edge is 8 cables E. ¼ N. from the north-west point of Aba sima.

OSAKI SIMA, a large island, the eastern shore of which forms the western shore of Aogi seto, is surmounted by a remarkable clump of trees (under which is a temple), named Ka-no-mine, 1,524 feet above high water, falling away in grassy slopes towards Noka no hana (the south-east point); and terminating in a nearly isolated granitic hill, 590 feet high, that falls with steep cliffs to the sea.

Wooded spurs extend both north and south from the summit, the north having on its centre a conical wooded mound (Higashi yama) 2¼ miles from Ka-no-mine, that forms the west end of the leading mark between the Admiral and Captain banks.

Mebaru saki, the north-east point of Osaki sima, has rocks that dry at low water stretching a short distance off the point; and from the north shore of the island a mud bank, having over it only a depth of one foot at low water, and very steep-to, extends nearly 2 cables.

Sanumi sima, a small island, lies off the north-east point of Osaki sima, separated from it by a channel a cable wide, blocked by the above-mentioned mud bank. The island is wooded, and is steep-to on all the other sides.

San umi shoal.—A mud bank a cable square in extent, having 3 feet water on it, lies N.N.E. ½ E. 2 cables from the north-east point of this island.

Kara sima, a small round islet 30 feet high, steep-to on all sides, lies N.N.E. nearly 6½ cables from the same point.

Noka no hana, the south-east point of Osaki sima, is bluff and steep-to. At 2 cables N. ½ W. lie rocks that uncover 3 feet at low water. Kinoi-ura, a small bay N. ¾ W. 1⅛ miles from Noka no hana, dries at low water to the line of its outer points. It contains a small village, where junks are repaired, between the piers.

Northward to Mebaru saki the coast is composed of shingly beaches, with cliffy points, all the valleys being cultivated some distance up the slopes.

The north coast of Osaki sima is deeply indented, principally by three large bays, Haraye no ura, Ōnishi no ura, and Nanami no ura, all shallow a considerable distance from their heads.

IKI or UMA SIMA, is a dark wooded island about one mile in extent, separated from the west side of Mebaru saki by a channel only 2 cables wide; it has a double summit, each surmounted by a conspicuous clump of trees, the south-eastern being about 700 feet above high water. A deep bay on the north side of the island is shallow at the head; and the west side has several deep inlets.

Kodono sima, a rocky (granite) islet, about $1\frac{1}{2}$ cables in extent, lies in the Aogi seto between the north-east point of Osaki sima and the north-west shore of Ō-mi sima; N.W. $\frac{1}{4}$ W. three-quarters of a cable off its south-west point is a rocky islet, 4 feet above high water; and at 2 cables north of the island is a rock having a depth of only 10 feet on it at low water. Nearly 3 cables E. by N. $\frac{1}{4}$ N., from the north-east point of Kodono sima, lies a rock with a stone beacon * on it about 5 feet above high water. The shoal continues for 3 cables E. by N. from the beacon.

Buoy.—A buoy coloured black and white in horizontal bands and surmounted by a cage, 10 feet above the water, is moored in $4\frac{1}{2}$ fathoms at low water, immediately north of the sunken rock (on which there is a depth of only 10 feet at low water), and 3 cables from the north extreme of Kodono sima.

Yoko sima, about three-quarters of a mile in extent and of very irregular outline, lying in the fairway of the Aogi seto, between Ō-mi sima and Osaki sima, consists of two islands joined by a sand-bank at low water, the larger having off its north extreme a wooded peninsula, which from a short distance resembles a third island. Off the north end of these islands, anchorage with good holding ground may be had in 10 to 11 fathoms, sandy bottom, with the north extreme of Yoko sima bearing N.W. by W. $\frac{1}{2}$ W., and the south extreme S. by W. $\frac{1}{2}$ W., $2\frac{1}{2}$ cables off shore. A rocky patch of 5 fathoms lies W. by S. $\frac{1}{4}$ S., 3 cables from the north point of this island. Vessels usually pass westward of this island when passing through the Aogi seto.

Ō-MI SIMA, $7\frac{1}{2}$ miles long north-east and south-west, with an average breadth of $2\frac{1}{2}$ miles, forms part of the east shore of Aogi seto, the northern of Kare seto, and the western of Kuruma no seto. It has high ranges, the west and north wooded, the south bare and granitic. Along its north and east shores several conical hills appear as if detached from the main body of the island. It is apparently divided into three portions by two valleys, the southern running from the south-east part of Ute no ura to the south shore, and the eastern from the village of Osaki to the east shore.

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* A loose pile of stones sometimes displaced by the sea.

Tagashi yama, the summit of Ō-mi sima, a dark wooded hill 1,465 feet high, lies in the south-west portion of the island, having a ridge running to the north-west, and several deep ravines on its west face.

Uté no ura is a deep bay on the west shore of Ō-mi sima, 1¾ miles across, with indentations at its south and north ends, and in the middle a dry water course of sand; on its shores are the villages of Uté no mura and Osaki. A bank of mud with a grassy surface, having 5 to 12 feet on the outer edge, lies across this bay, 9½ cables from the shore. The point north of this bay has a large land-slip from the north-west face of a granitic hill.

The eastern shore of Ō mi sima forms the western side of the Kuruma seto. (*See* page 419.)

Niwatori jima, is a narrow islet about 200 feet high, lying 1½ miles S.W. by S. from Yoko sima, and 7 cables E. by N. from Noka no hana; a small patch of shoal water extends half a cable from its east end.

OGE SIMA, the eastern island at the south entrance to the Aogi seto, is a well cultivated island, 1¼ miles in extent (N.W. and S.E.), having a wooded summit 700 feet above high-water. At its south end is a peninsula 323 feet high, wooded at the summit, with dark basaltic cliffs on the west side, forming a small bay with a village at its head. The island has several off-lying boulders on its south-side, and off its south-east point, but may be safely approached to one cable.

The channels between Ō-mi sima and Oge sima have shallow water in them, and should not be taken except in emergency, when the coast of Oge sima must be kept quite close on board.

Kashira, a small island, 250 feet, lying between Oge sima and Ō-mi sima has grassy slopes, scattered over with trees.

Hi sima is an undulating island lying 6 cables south of Kashira, with steep cliffs on the south-west point, and a small islet close-to off the south-east end. From its east point which approaches the shore of Ō-mi sima closely, Michi kojima, a chain of islets and rocks, extend S.E. by E. ¾ E. 3 cables, the outer of which should not be approached nearer than a quarter of a mile.

KO-OGE SIMA, 6½ cables in extent, lying on the western side of the south entrance to the Aogi seto, has at its south-west extreme a remarkable conical grass covered hill, 434 feet high, sloping steeply to its southern coast. This shore is fringed with quartz-faced boulders, which from a short distance resemble a wall, and form an excellent object for distinguishing the western entrance to Aogi seto. On its north side is a small bay, where considerable quantities of granite are quarried. The island is steep-to all round.

Directions for AOGI SETO.—The entrance to Aogi seto from the westward may be readily distinguished by the conical hill and white quartz-faced boulders of Ko-oge sima and the dark wooded Oge sima, care being taken not to mistake the south-west point of Okamura for Ko-oge, as it also has some white rocks at the base. The mid-channel between these islands being taken, a course should be steered to pass midway between Noka no bana and Niwatori jima, after passing which the vessel must be steered midway between the shore of Osaki sima and Yoko sima until abreast the south point of the latter, when the Osaki shore should be closed, to avoid the foul ground west of Yoko sima.

After passing Kodono sima, give the north shore of the island a berth of 3½ cables, and pass west of the buoy marking the rock awash, which lies 2 cables from the north end of the island, after passing which a course should be steered to pass in mid channel between Matsu sima and Kuno sima on the north, and Ō-mi sima on the south; and when east of this channel the round wooded summit of Osaki sima (*not* the clump), should be brought in line with the north extreme of Ō-mi sima, bearing S.W. by W. ½ W. These marks kept in line (astern) will lead between the Admiral and Captain banks, to mid-channel between that island and the main land. The north shore should be kept about half a mile off until abreast Kosaki sima, when that island may be rounded, borrowing rather over to Matsu hama, the village south-east of Miwara, to avoid the sandbank between Sukune sima and the beacon east of it.

Between Iwashi sima and Hoso sima, keep in mid-channel and also between Mukai sima and In-no sima, until Sasa jima, the small islet off Mukai sima, bears N. by E., when the fall of Hachi gaune, (the bluff east entrance ot Miwara), should be brought in line with the north-east point of Hoso sima, bearing N.W. by W. ¼ W.; this mark will lead out into the Bingo nada, clear of all dangers.

Tides.—The tidal streams in the Aogi seto appear to take the line of the channel, running with a velocity of 2½ knots round Noka no hana; 3 to 4 knots in the channel between Kuno sima and Ō-mi sima; and with an average velocity of 3 knots to the narrows between Mukai sima and In-no sima (Mekari no seto), where they increase their rate to 3½ knots. The flood runs to the eastward and the ebb to the westward.

It is high water, full and change, at Miwara, at 10h. 37m. Springs range 11 feet, neaps 5 feet. The stream changes to flood at low water, and to ebb three-quarters of an hour after high water.

OKAMURA SIMA, an island about 2 miles long (east and west) separated from the west shore of Ko-ogé sima by a channel only 1½ cables wide, presents a varied appearance, from the alternation of cultivation and wood; its projecting south point* is faced by quartz. On the south-east side is a deep bay with a large village at the head. The east and north coasts are of shingle or sand, with no conspicuous feature. The island makes in a double summit when seen from east or west, the highest being 724 feet above high water.

The channel between Mitari and Okamura is too narrow for ships to take, being nearly blocked up by three islands, Mi ō-to jima, at its north-west end. A shoal of 3½ fathoms steep-to, lies E. by N., 1¼ cables from the lighthouse. The anchorage off its south entrance is not good, because of the continual whirl of tide, but vessels wishing to stop for a short time will find good holding ground in from 9 to 13 fathoms sand, with Okamura south point bearing East, and Mitarai lighthouse bearing N.W.

MITARAI SIMA, a high wooded island to the westward of Okamura and the entrance to the Aogi seto, has a flat-topped summit 1,443 feet above high water, sloping gradually to its west end, when it falls abruptly, has a sligthly indented coast line, and an apparently bare double peak at its eastern end, sloping down to a considerable village, with a remarkable white wall at the eastern extreme. South of the village is a Japanese lighthouse, merely a lantern, and rarely lit.

Off the west end of the island is a small rocky islet, 18 feet high (Tzuzmi sima,) surrounded with rocks, and marking the channel between Mitarai and Toyo sima. This passage has only been partially examined, but has apparently deep water.

The north shore has a deep bay, shallow at its head and deep immediately beyond, affording no anchorage. From this, separated by a channel of 3 cables width, lies the wooded and partially cultivated Mikado sima, 400 feet high, deeply indented, having a sandbank that dries S.E., 1½ cables from its north point; and from its south-west point a reef, steep-to on its south end, stretches out 1½ cables.

KURUMA NO SETO—SETO-DA JIMA, a large island nearly 5 miles long (N.E. and S.W.) and 2½ miles wide, lying southward of Ko-ne sima, and forming with Ō-mi sima part of the Kuruma no seto, has a range of hills, with a conspicuous gap near the middle, extending along its entire length, the highest peak of which is Ninoge yama, a double summit near its south-west end, 1,547 feet above the sea, the middle peak being 1,350 feet, and the eastern 1,328 feet high. The island is cultivated some distance from the shores on all sides but the east which is wooded from summit to water's edge, and is steep-to. Off the north side some rocks and a sand-bank that dries, lie one cable from the shore, and with the strong tides prevent the navigation of the channel between this island and Ko-ne sima. S.E. by S. ¼ S. a little more than a mile from the south-west point of this island lies a rock with 4 fathoms on it steep-to all round. Along the north shore a great quantity of salt is manufactured by evaporation from the salt water in the numerous creeks surrounding the mud flats prepared for that purpose.

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* Care should be taken not to confound this point with Ko-oge sima.

Hiotan Jima, at the entrance of the channel, is a small isolated island, a cable long by half a cable wide surmounted by trees, that appear as a remarkable single tree. The spur running to the north has also two trees at its summit.

Ō-MI SIMA.—The east shore of Ō-mi sima forming the west shore of the Kuruma no seto has a succession of shingly beaches with villages scattered along their shores, and near the centre a sandy watercourse.

A beacon about five feet above high water is erected on a rock 1½ cables off a steep point in the centre of the east coast of Ō-mi sima, a rock awash lying N.W. 2 cables from it. The beacon must not be approached within a cable, and here the tide ripples with great force at springs, the channel being only half a mile wide between the beacon and the south-west shore of Seto-da-jima. S. by W. 7½ cables from the beacon lie two wooded islets joined to the shore (1¼ cables distant) by a sandbank that dries at low water.

Hanaguri seto, the channel between Ō-mi sima and Hakata sima, has an average breadth of 1½ cables, and there is no danger in the mid-channel; but the rush of tide is so great, except at slack water, that no vessel should take it except in emergency.

From this channel the coast of Ō-mi sima runs with a general direction of W. by S., having only a slight curve for 5 miles, to the passage between it and Hishima, the background being granitic ranges, to the valley that separates it from the wooded slopes of Takashi yama.

HAKATA SIMA, an island about 4 miles long (east and west), and 3 miles broad, lies on the south side of the Kuruma no seto. The island has near its west shore a high range, with three peaks, (extending north-west and south-east) falling steeply on the south-east side, while a spur of nearly equal height turns off to the northward. The south-east peak, Hokosan, 1,006 feet high, is surmounted by a sharp clump, and the north-west peak, Jiu-no-ka, by an isolated tree.

The north-west point is bluff, having a rock awash one cable off it. From this bluff the coast trends nearly east to the north-east point, with shallow bays between. The north-east point is narrow, sloping from a low hill apparently nearly isolated, and steep-to. The east point forming the west side of the south entrance to Kuruma no seto, lies S.E. $\frac{1}{2}$ E. 2 miles from the north-east point, and has off it a conical islet to which it is joined at low water; the islet is steep-to. Between the north-east and east points is a deep bay in which is a small islet, and having foul ground extending to the line of the points.

The south-west point of Seto-da jima, open of the north-east point of Hakata sima bearing N.W. $\frac{3}{4}$ W., clears all the shoal ground in the above mentioned bay. Hasona, the steep, bluff, south-east point of Hakata sima, forming the northern side of the entrance to Kare seto, has two patches of rocks off it; Mutsu se, lying S.E. a quarter of a mile, and Futa ishi nearly one cable South. The latter patch never covers, and may be approached to within a quarter of a mile.

The coast of Hakata west of this forms a deep bay with a village on its shore, and trends to the narrow pass of Wusima no seto, a passage that should never be taken by vessels. On the south-west coast is the sandy bay of Ka no ura, with shallow water fringing the shore for 3$\frac{3}{4}$ cables. From this the coast is wooded and rugged to the entrance of Hanaguri seto.

IWAGI SIMA, on the northern side of Kuruma no seto, lies eastward of Seto-da-jima, its southern point being 2$\frac{1}{2}$ miles from the south end of that island, but its northern shore approaching the north-east coast of Seto-da-jima to within a distance of 4 cables. Iwagi sima is 2$\frac{1}{2}$ miles long (north and south), and 1$\frac{7}{10}$ miles broad; it is covered with grass and cultivated round the base, rising to a sharp peak 1,177 feet high, with a line of wood running down the south-east slope. A reef stretches half a cable from the south-west point, the outer rock being generally marked by a tree. Rocks that dry, and foul ground, extend 6 cables W.N.W. from the west point.

Izebi bank, situated N.N.W. $\frac{1}{4}$ W. 7$\frac{1}{2}$ cables from the south-west point of Iwagi is half a mile in extent, with 3 feet water only on its east extreme. At 1$\frac{1}{3}$ miles N.W. by W. lies a shoal of 3$\frac{1}{2}$ fathoms steep-to on the southern edge with the south extreme, of Seto-da jima bearing W. by N. $\frac{1}{4}$ N.

The channels, north, south, and east of this island should not be navigated unaided by the chart, and then only at slack water. Off the north-west point, almost joined to it at low water, lies the wooded islet Tobi sima, 90 feet in height.

HAKO SIMA, about one mile in extent, lies off the south-east shore of Iwagi sima, from which it is separated by a channel only 2½ cables wide; it has smooth grassy slopes and a flat summit 536 feet high surmounted by a clump of trees, and with cliffy faces on the south west side. Off the west side shoal water extends 3 cables.

MU SIMA, one mile long N.E. and S.W. and 600 yards broad at its south end, tapering to a narrow point northward, lies south of Hako sima, separated from it by a channel only 1½ cables wide. It has two hummocks joined by a shingly spit, the highest being over the south-west point, cliff-faced, and steep-to.

Between this island and the north-east point off Hakata sima is the eastern entrance to the Kuruma no seto.

Directions for KURUMA NO SETO.—The directions for Aogi seto should be followed until clearing the channel between Kuno and Ō-mi sima, when the shore of the latter should be rounded at three-quarters of a mile, and a south-east course steered to pass a quarter of a mile east of Hiotan jima, and the same distance west of the south-west point of Seto-da jima; bearing in mind that the ebb sweeps strongly towards the beacon on the west side of the channel.

The Seto-da jima shore should be kept about a quarter of a mile off until the islet off the east point of Hakata sima (at the east entrance to the channel) opens of the north-east point bearing S.E. ¼ E., when a course should be steered to pass the latter point at a quarter of a mile, and then for mid-channel between the islet off the east point and Mu sima, taking care to keep the south-west point of Seto-da jima open of the north-east point of Hakata sima bearing N.W. ¾ W., to avoid the foul ground in the bay between the east and north-east points of that island.

Tides.—In the Kuruma no seto the flood stream sets to the south-east and the ebb to north-west, with a velocity of 2½ to 3 knots, in the direction of the channel, except off the south-west point of Seto-da jima, where the ebb sweeps partly across the channel towards the stone beacon on the west side.

TSUBA SIMA, an island, nearly 2 miles long, lying north-east of Iwagi sima, from which it is separated by a channel only 2 cables wide at its southern end, has bare granitic ranges, and shews out from the southward against the dark wooded ranges of In-no sima. Off its north end a group of islets and rocks nearly joins it to that island.

IKINA, about the same length as Tsuba, but narrower, lies south-east of the latter island, separated from it by a channel only 2½ cables wide. The hills are covered with scrub alternating with bare granitic ranges, and the island makes in a double summit when seen from the southward, and is cultivated in patches round its base.

Rocks.—A patch of 9 feet lies 2 cables from the middle of the west shore of the island.

Wu sima, a small island in the Karé seto,to the southward of Hakata sima, rises in gentle wooded slopes to the summit. Off the north point are the Shi-ziu kojima, rocks joined together at low water, having two pinnacles that shew at high water.

Off the eastern side of this island shoal water extends 1½ cables. From its south-west extreme, separated by a narrow channel, are two islets, the north-western and higher surmounted by a single tree.

In this channel are two rocks, the north-eastern with 13 feet on it, and the other awash at low water. These, the strong tides, and the width of the channel, forbid vessels attempting it.

Michi-ga saki is a flat island cultivated along its entire length, lying off the south point of Hakata sima, westward of the Wu sima. Two pinnacle rocks, Niwatori jima, with rocks awash close to, lie off the same point.

YANAGI SETO, the channel between Osaki sima and the mainland of Nipon to the north-west of Aogi seto, contains a large archipelago principally distributed near the coast of Osaki sima, to the north of which there is a safe channel as far as the meridian of Ō-shiba. Between the islands, and from them to Osaki sima, it is foul and shallow.*

On entering this channel from the westward, Tsukugawa jima makes as the first island north of Osaki sima, a grass-covered mound steep-to on every side but the north, from which a reef extends 4 cables, steep-to on the outer edge.

Tzuzuki are three remarkably peaked rocks, having reefs that cover off them. They may, however, be safely approached on their north side to 1½ cables.

NAGA SIMA, lying close off the north shore of Ōsaki sima, is a wooded island, with red cliffs and granite hills much indented, and having deep ravines.

USU SIMA lies nearly half a mile north-east from Naga sima; it has a double summit, each surmounted by a tuft of trees. Off the north-east extreme lies Ko-usu sima, a narrow wooded islet, with dark cliffs on the south side, and off the south-west point is a wooded island, joined to it at low water.

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* The western entrance to this strait has not been surveyed, but it is reported to be safe, although not more than 70 yards wide in its narrowest part.

Chikiri sima, a small island 6 cables north-east from Ko-usu sima, is composed of three hillocks, joined at their bases by a shingly beach steep-to on its north side.

AKI or GESHIU.—All the south shore of Nipon here spoken of is in the province of Aki or Geshiu.

Shira, a densely wooded island, with a single tree on the summit, forms the west side of the large bay, Akasaki no ura on the mainland of Nipon, across whose mouth a bar of mud, with a depth of only from one to 2 fathoms on it, prevents vessels from making use of the anchorage that the bay would otherwise afford. At the head of the bay stands the large village of Mitzura, and great quantities of salt are made round its shores.

Akasaki no ura, contains four islands. Hira jima, the south-western, cultivated all over its flat mound. Riu jima, the north-western, dark wooded, with red cliffs round its margin. The two eastern, Ō-moro jima and Hanaguri jima, are elongated cliffy islets, surrounded by boulders and shingle that dry at low water. The point at the eastern entrance of the bay, and from which it derives the name Akai saki, is very conspicuous from the red cliffs that fringe it. Off this, separated by a shallow channel of 3½ cables, lies Tō-sen, a wooded islet, from the north-east end of which a shingly spit that dries at low water, extends nearly 2 cables.

MISIMA NADA.—This portion of the Seto uchi is 30 miles long, east and west, about the same distance north and south, and is studded with numerous groups of islands, islets, and rocks, of which as yet little is known. Between the provinces of Suwo and Aki, the northern part of the Misima nada forms a deep bight 30 miles in extent by 20 miles wide.

At its north extreme is the large town of Hiro sima, on the shore of Nipon. The southern boundary of the Misima nada is an extensive chain of islands stretching across the Seto uchi in an east and west direction, of which Tsuwadse sima, Naka sima, Nuwa sima, Musuki, Nobotsuna, and Gogo sima are the largest. The route taken by vessels passing through the Seto uchi lies through the south-eastern part of the Misima Nada, within 2 to 3 miles from the mainland of Sikok.

HIRO SIMA.—Proceeding for the northern part of the Misima nada towards Hiro sima from the Aogi seto, steer for Numa sima, passing to the southward of the two Tatsiba islands, which are easy to distinguish.

Shiraishi.—Between the south Tatsiba island and Sika-sima (or Mugi sima) are some rocks above water, called Shiraishi, or White rocks South of Mugi sima lies a small island called Kobayama.

Frolic channel.—The best channel lies between Kobayama and Yoko sima, but if passing to the westward of Yoko sima give it a good berth, as between Yoko and Kuro sima are some outlying rocks

When well clear of Kuro sima, steer for the north-east point of Atada, an island 600 feet high, and easy to distinguish by the single tree on its summit; it is the only tree visible on the island.

Himiko sima is a small sugar-loaf rock.

MISINOBI (or Nomijima,) is about 1,400 feet high, and 35 miles in circumference.

When steering for Atado and passing Kuro-Kami, a high and steep island, Shiraishi, will be plainly visible, and this may, it is reported, be passed on either side. The *Frolic** passed on the eastern side, and had 16 fathoms; the rocks are reported steep-to.

Longford rock.—A rock with only 5 feet on it at low water lies about 2 cables to the southward of the north-west point of Kurokami; from the rock, Shiraishi bears W. by S., nearly. This rock, now named Longford rock, is not dangerous to passing vessels provided they hug Shiraishi.

Plunkett shoal.—From Shiraishi steer to pass to the westward of Kokurokami, bearing in mind that to the eastward, off the north-west point of Misinobi island, there is a rocky patch, now named Plunkett shoal, which should not be approached. When the east point of Nasabi and west point of Kokurokami are touching, and bearing about N. 31° E., Plunkett shoal will lie about midway between the two islands, and shutting in.

The channel is continued between Itsuku and Nasabi. Itsuku is a beautifully wooded island.

Chikiri sima, is a small island north of Nasabi.

Itsuku.—On the north-west point of Itsuku will be seen a small shrine, and between this and the northern point is a bay in which there is said to be good anchorage.

From Chikirisima, steer to pass close to and west of the small islet in the centre of the bay named Tsukune sima. It has one tree on the top, and some scrub. From this islet, which has 8 fathoms close-to, steer N.N.E. ½ E. for the end of a bare hill (not for the north-west bluff), and anchor with a small tree on north-west bluff in line with a small peak in dip of distant hills, when the vessel will be off Kusatsu no mura, the easternmost of two villages

In front of Kusatsu no mura is a good breakwater, and shelter for junks, but at low-water springs the breakwater is left quite dry. The water shoals very gradually, and a small vessel may anchor close to the shore in 3½ to 4 fathoms at low water, good holding ground, with the bluff bearing W. ¾ S., and Tsukune sima, South.

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* Commander C. E. Buckle, H.M.S. *Frolic*.

Islands in the MISIMA NADA.—The following, lying in the immediate vicinity of the track usually taken by vessels passing through this sea, only have been surveyed *:—

Itsuki sima, an island north of the route, about three-quarters of a mile long east and west, and 300 feet high, 4½ miles W. ½ N. from Kajitori saki, has not been closely examined.

Black and White rocks, situated S.W. by W. 2 miles from Itsuki sima, are about 7 feet high, said to be connected with the island by foul ground. Itsuki and these rocks should not be approached closely.

O Ai sima is about one mile in extent and about 200 feet high; it lies 2½ miles S.W. by W. ½ W. from the Black and White rocks.

Ko Ai sima or Round island, lies about 1¼ miles S.E. by S. from O Ai sima, is about 180 feet high, and is conspicuously round, as its name implies.

Channels between MISIMA and IYO NADAS.—The usual route taken by vessels passing through is between the islands of Nobotsuna sima, Musuki, Naka sima, and Yuri (on the north), and Gogo sima and Tsuru sima (on the south); but there is another channel, sometimes used, passing north of Naka sima and Futukami, and south of Nuwa sima; the former is, however, the better.

NOBOTSUNA SIMA, 5 miles S.S.W. from Ko Ai sima, has a rough appearance from a number of projecting nobs, which are quite barren. A ledge of rocks with 19 feet on its extreme point extends under water from the first cliff West of the eastern point of the island. The ledge is about 3¼ cables long, and it also projects eastward of the east point of the island. Vessels should pass half a mile from this part of Nobotsuna sima.

MUSUKI, an island about 1½ miles across in all directions, lies a little over half a mile westward of Nobotsuna; it is about 738 feet high, forming a conspicuous conical hill with a clump of trees upon it, the north side of the hill being cultivated.

Anchorage may be obtained in the small bay on the south side of Musuki, off the village, but the water is deep. Two plateaux of rocks, of which only one is visible at low water, obstruct the passage between Nobotsuna and Musuki.

NAKA SIMA, the largest of the chain of islands lying between the Misima and Iyo nadas, is 5 miles long N.E. and S.W., and 3 miles broad near the south end, tapering away northward to a long narrow peninsula. The island is hilly, some of its peaks being nearly 1,000 feet high.

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* *See* Admiralty plan: Channels between Misima nada and Iyo nada, No. 83; scale $m = 1{\cdot}5$ inches.

Anchorage.—There are several small bays on the shores of Naka sima, where anchorage may be obtained, but the best and most convenient is on the south side of the island, about one mile N.N.E. ½ E. from Fuguri rock, in 22 feet water; and on a bank of mud which skirts the south shore of the island east of Aka saki, the south point.

Taka sima and Conical islet.—Three small islets lie off the south shore of Naka sima, the two northern (Taka sima) being close to the coast. They are joined by a rocky reef to a third islet (conical) lying half a mile S.E. from them.

The passage between Musuki and Naka sima, although practicable, is very narrow, on account of a shingly spit which extends under water from the east point of the latter island.

Fuguri, a rock 26 feet high, lies 5 cables S.E. from the south point of Naka sima. This rock is steep to, and is connected to the south point of the island by a flat on which there are from 6½ to 11 fathoms water.

Kutako sima.—A rock with 10 feet water on it lies S.S.W. about 3½ cables from the small islet named Kutako in the channel between Naka sima and Nuwa sima.

An extensive and dangerous reef of rocks, one of which has only 1½ feet on it at low water, lies S.E. 5 cables from the small island of Maru yama.

NUWA SIMA, an island lying 1½ miles westward of Naka sima is about 2 miles long (north and south) and one mile wide.

There are dangers off the N.E. and N.W. points of the island, and they should not be approached nearer than 4 cables.

Futago islets, two in number, lying off the south point of the island, are dangerous of approach on the west side within 3 cables.

A rock which uncovers at low water, lies about 1½ cables from the western islet, with the two islets in line.

Futakami sima, a narrow island 2 miles long east and west, lies 1¼ miles south of the Futago islets with a deep channel between, which is used by vessels passing north of Naka sima.

Toko sima, Ko ishi, and O ishi, form a chain of small islets extending in a south-east direction from the east end of Futakami. O ishi, the outer of the chain, 2¼ miles south-east of Futakami, on the border of the fairway channel, is small and conical. There are deep water channels between these islets.

GOGO SIMA,* an island of very irregular outline, nearly 4 miles long, north and south, and from 300 yards to 1½ miles broad lies off the mainland of Sikok, its southern point approaching it within half a mile; it is thickly wooded and but little cultivated. The north part of the island, which is somewhat sloping and rugged, forms in several hills about 400 feet high, and is joined to the south end by a low ridge. The southern part forms in a wooded peak 945 feet high.

Yura bay, on the east side of the island, affords sheltered anchorage, but care must be taken to avoid an isolated bank of 9 feet (sand and weed bottom) lying nearly in the middle of the bay. On the north shore of the bay is the village of Yura.

The channel between Gogo sima and the mainland is deep and clear of danger.

Anchorage, with good holding ground (stiff mud) and clear of the tide, may be had in the north bay of Gogo sima, in 7½ fathoms water, with Ka sima bearing N. 49 E. and Taka sima S. 58° E. Care must be taken that the vessel be well on the bank, which is of but small extent, and there is deep water close to it. Vessels passing westward with night drawing on, or in thick weather, will find this anchorage useful.

Tsuru sima, a small island 6 cables long (N.W. and S.E.) lies one mile from the western shore of Gogo sima; it is highest at its southern end, which is a round wooded summit 502 feet high, partially cultivated. The hills slope down to the northern point of the island, which is low and flat with a clump of trees on it.

LIGHT.—From a lighthouse 30 feet high situated on the north-west point of Tsuru, about 400 yards from the beach, at an elevation of 186 feet above the sea, is exhibited a *fixed* white light of the third order, visible seaward between the bearings of N. ¾ E. (through East, and South) and W. by S. ½ S.; and in clear weather should be seen from a distance of 20 miles.

Tides.—It is high water, full and change, at Tsuru sima at 10 h. 10 m.; springs rise 11 feet, neaps 7¾ feet.

YURI, a small island about one mile in length (east and west), has two summits, the eastern being 410 and the western 180 feet high; they are joined by a low sandy isthmus, and appear as two islands when seen from the north-east or south-west. The hills are covered with thicket, in which deer have been found. Anchorage may be had on its southern side, but in deep water (not recommended) and the island may be passed either to the north or south at one-third of a mile.

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* *See* Admiralty plan:—Gogo sima and Horiyé anchorages, No. 694; scale $m = 2{\cdot}0$ inches.

WAKI MURA HANA is a bluff point of about 200 feet in height, from which the land rises to the eastward or inland in irregular slopes to three conspicuously sharp peaks of about 1,000 feet. The coast eastward to the village of Kikuma (*see* page 409) takes a north-easterly direction. To the westward the coast takes a southerly direction for 6 or 7 miles, and then taking a sudden turn to the westward approaches Gogo sima within a mile.

Ka sima, a small islet lying close to the shore, is about 400 feet high, conical in form, and has a wooded summit.

Kantoe rocks.—Half a mile westward of Ka sima is a group of rocks, the outer being a pinnacle and steep-to on its west side. Vessels should not pass between these rocks and Ka sima.

Anchorage—Horiyé bay, the bay south of Waki mura hana, affords good anchorage in 6 to 9 fathoms with the north point of Gogo sima bearing W. ¼ S.

Taka sima, or Tsugahi bank, is a shoal bank of 9 feet, lying 1¼ miles N.W. by W. from Horiyé breakwater, and 1$\frac{2}{10}$ miles south-west of the anchorage in Horiyé bay.

Oozu-no Su bank.—A sandbank on which is a depth of 14 feet at low water, lies in the same bay about midway between Ka sima and Gogo sima; with the easternmost of the rocks which are seen west of Ka sima in line with Waki Mura hana (cape Simonamba).

Directions.—After rounding Ozumi no hana, Itsuki sima, a comparatively low island with bare ridges of a reddish colour, should be steered for W. by S. ¼ S., until Kajitori saki bears about S.W. by S., when alter course to S.W. ¼ S. for the middle of the channel between Waki mura hana and Nobotsuna sima, passing the former at about three-quarters of a mile. When abreast of Ka sima haul up S.W. ½ W. keeping in mid channel between Musuki and Gogo sima, and passing 6 cables northward of Tsuru sima lighthouse, and the same distance south of Yuri sima.

IYO NADA.—This portion of the Seto uchi lies westward of the chain of islands above described, between which and Hime sima its western boundary is 55 miles. The whole of its shores are as yet unsurveyed,* but that to the south appears clear, with no off-lying islands or indications of danger; its northern shore, however, is skirted by groups of islands and rocks.

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* Great caution should always be observed when approaching any of the coast which has been inserted on the charts from the Japanese manuscript only, as the sunken dangers are not often shown on that document. On the Admiralty charts this coast is delineated in hair line.

On the southern shore (province of Iyo in Sikok) immediately south of Ao sima (Ozuawa), and a short distance south-west of the village of Nagahama, is a junk harbour principally formed by artificial means. At the south-west of the sea is a deep bight on the north shore of the island of Kiusiu, which from this, westward, forms part of the southern shore of the Seto uchi. In this bight are several deep indentations, which are probably good anchorages; several large rivers also flow into this part of the Iyo nada; and the southern point, Sagano saki, is also the western point of the northern entrance to the Boungo channel (*see* page 341).

Anchorage can be obtained off the town off Mitouga hama, about E. by S. of the south point of Gogo sima. The town is situated at the mouth of the Hori gawa, and has a small tidal harbour and forts on the shore southward.

The islands immediately in the vicinity of the track of vessels passing through the Iyo nada, are,—

O-MINASI AND KO MINASI SIMA, small islands lying north and south of each other $1\frac{1}{4}$ miles apart, both lie to the northward of the usual route, distant about 7 miles south-westward from Yuri O-Minasi, the northern, largest, and highest, is conspicuous, its summit being 550 feet high. Ko Minasi rises nearly perpendicular on all sides to a comparatively flat summit about 200 feet high ; it is thought to be steep-to on its south side, and vessels usually pass at about one-third of a mile from it. Both these islands are covered with brushwood and have not been surveyed.

YA SIMA, a larger island, lying on the north of the track, about 13 miles W. by S. from Ko Minasi, is high at its north and south points (from 500 to 600 feet), and low in the centre.

Anchorage may be obtained on the west side of the island in 11 fathoms sand and gravel, midway between the two points, the bottom shoaling gradually up to the beach, which is low and fringed with trees. This bay is open from South to West and N.W.*

Uwa sima, 5 miles west of Ya sima, is small, with a cluster of rocks off its south-west side.

IWAMI SIMA, about 2 miles in extent, lies 3 miles N.W. from Uwa sima ; there is a cone-shaped island eastward of it, which may be passed close-to on its south-west side.

HIME SIMA,† lies about W. $\frac{1}{4}$ N. 22 miles from Ya sima, is $3\frac{1}{2}$ miles long east and west, $1\frac{1}{2}$ miles broad in the centre, and its sugar loaf shaped peak, 885 feet high, is a conspicuous object throughout the whole length of the Suwo nada.

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* Navigating Lieutenant Adlam, H.M.S. *Juno,* 1869.

† *See* Admiralty plan:—Hime sima roads No. 770; scale $m = 2{\cdot}45$ inches.

There are three bays on the north side of Hime sima,—the north-west bay, the middle or reef bay (Kita ura), and north-east bay. The north-west bay, Nisi ura, was used as a rendezvous for the fleet in 1864. There is good anchorage in it with easterly winds between E.N.E. and South, in 5 to 14 fathoms, sandy bottom. With the peak bearing E.S.E., and the west point S. by E., there are 12 and 13 fathoms, soft sand. There is safe anchorage for small vessels in 7 fathoms in the middle of the bay, on the line of the east and west points.

The north-east bay is unsafe for large vessels; small vessels, however, windbound, will find good anchorage off the middle of either it, or in Kita ura, in 5 to 7 fathoms.

Kita ura, the middle bay, is divided into two parts by a reef, a portion of which is always above water; there are 5 fathoms on each side of the reef, on the line of the points of the bay. The middle or reef bay is only used by junks at high water. There are mineral springs on the N.E. side of the island.

Miname ura, a bay on the south-west side of Hime sima, affords shelter with winds from W.N.W. (round north) to N.E. in 4¾ fathoms to 8 fathoms on the bank which surrounds the island.

Anchorage.—There is sufficient room for several vessels with the eastern bluff bearing East to E.N.E. Large vessels should anchor in 8 fathoms, sand and mud, with Pinnacle rock bearing N.E. distant 6 cables; or in 13 fathoms with Pinnacle rock (off the east end of the island) in line with the south point bearing E.N.E., and the clump of trees over Damma hana N.W. ¼ W. Care is necessary when anchoring nearer the shore than the above position, as the water shoals suddenly from 10 to 5 fathoms. The strong tides felt at this anchorage, and the bad holding ground, however, are a great drawback.

Tides.—The flood tide sets to the north-westward, and the ebb to the south-eastward, at the rate of one to 1½ knots an hour.* It is high water, full and change, at about 8h. 45m.; springs rise 8 feet, neaps 3½ feet.

Directions for IYO and SUWO NADAS.—From Nobotsuna sima a course may be shaped to pass on either side of Yuri, the south side being preferable, from which a course S.W. by W. ¾ W. will lead up to pass about one mile south of Ko Minasi sima, thence steer W. by S. ¼ S. to pass about 1½ miles southward of Ya sima. When Ya sima bears North steer W. by N. ½ N. This course leads about 1¾ miles northward of Hime sima, but according to the tide, vessels are either set to the southward towards the Boungo channel, or to the north-westward, towards Iwami sima. Continuing this course from Hime sima will lead through the Suwo nada up to the entrance to Simonoseki strait.

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* H.M.S. *Sylvia* when abreast the north point of Hime sima was steered E. ½ S. for Ya sima and 2 hours afterwards was found just to the southward of Iwami. The weather was thick and blowing hard, and the flood tide running.—Nav. Lieut. Pearce, 1874.

The SUWO NADA, the western division of the Seto Uchi, is the most open but of no great depth, the soundings varying from 15 to 25 fathoms in the centre. It is bounded on the north by the provinces of Suwo and Nagato in Nipon, and on the south by the province of Buzen in Kiusiu, and on the east by Hime sima; and is about 40 miles in length (east and west). At its western extreme is the strait of Simonoseki, the western approach to the Inland sea.

KUMAGE and NISINAKA BAYS, on the coast of the mainland south-west of Hime sima, were examined, and found to be convenient for vessels wind-bound through the Boungo channel, the anchorage in each being on the line of their outer points in 5 and 6 fathoms, mud bottom.

NAGA SAKI, to the south-west of the above bays, may be known by its outer extremity being perpendicular, and having a clump of trees on it; as well as by its having, at 40 yards from its base, a small rock with a clump of trees also on it, which at a distance has the appearance of a boat under sail. The soundings obtained in this vicinity showed muddy bottom.

Vessels coming from the Boungo channel, may round any of these bluff points, forming the bays on the north-east coast of Kiusiu, at the distance of half a mile.

The COAST of Kiusiu westward from Naga saki to Miodsin saki, and northward to cape Imagawa (about 7 miles south of I saki lighthouse) has not yet (1883) been surveyed. Depths of 7 and 8 fathoms are obtained at 3 miles from the shore.

CAPE IMAGAWA, 10½ miles W.S.W. of Moto yama, terminates in a bluff point, and on a westerly bearing appears in a succession of hills, one rising above the other, stretching away to the northward. All the islands, as well as the points of land (from the Japanese manuscript), on this part of the coast appear to be correctly placed on the chart.

Faye sima is a small oblong-shaped island, which on a S.W. bearing assumes the shape of a haycock.

Ma sima, a small island lying southward of cape Imagawa, when seen from the eastward, makes as a low, short island, having a hummock on each end.

Murigawa, is a small rocky islet having its summit covered with trees. In thick weather cape Imagawa, with Ma sima and Murigawa, are good marks for leading towards Simoneseki strait.

Mura sima, a small island, lying close to the land, about 2 miles north of cape Imagawa, is low, with a slightly rounded top.

Anchorage.—There appears to be good anchorage at 1½ to 2 miles from this shore, between cape Imagawa and I saki, in 6 to 7 fathoms; anchorage may also be obtained in 20 fathoms, in any part of the Suwo nada.

MOTO YAMA, the promontory of land stretching to the southward from the north shore of the Suwo nada, about 7 miles eastward of Simonoseki strait, may be known by its long point terminating in a perpendicular bluff having several clumps of trees on it; the land behind, or to the northward of the point, rising in hummocks one above the other, each hummock being crowned with a clump of trees.

A shoal bank extends in a S.E. ½ S. direction from Moto yama cape; its outer edge of 2½ fathoms lying 5 miles from the cape. There is apparently deep water between this shoal and the bank skirting the shore, but it has not been closely examined.

Buoy.—The southern limit of the above shoal is marked by a red buoy surmounted by a cage 15 feet above the water, which is moored in 5½ fathoms at low water, immediately south of a patch of 2½ fathoms.

Directions.—Vessels bound from the Boungo channel or from the eastward to Simonoseki strait, may steer to pass Moto yama at a distance of 3 or 4 miles. Thence a course should be shaped, N.W. ¾ W. for I saki, which is high and bold, as well as steep-to, and may be rounded at a distance of 2 or 3 cables. At night keep I saki *white* light in sight bearing N.W. ½ N.

I SAKI (He saki), is the eastern promontory of the north point of Kiusiu, and the southern point of the eastern entrance to Simonoseki strait; it may be passed at a distance of 2 cables.

LIGHT.—From a lighthouse 30 feet high situated on the north-east extreme of He saki, at an elevation of 122 feet above the sea, is exhibited a *fixed* light, showing *red* when bearing from E. by S. (through south and west) to N.W. ¾ W., and white from the latter bearing to N. ½ E.; it should be visible in clear weather from a distance of 16 miles.

The junction of the red and white lights bearing N.W. ¾ W. clears the shoals off Moto yama.

SIMONOSEKI STRAIT,* the western entrance to the Seto uchi, is 15 miles in length, between Ai-no sima at its west and I saki at its east extreme, and has a navigable channel varying from 2¾ to 7 cables in breadth. The strait proper, between the shores of Nipon and Kiusiu, is, however, only 7 miles in length. Both entrances are encumbered with sandbanks, particularly the western, between which and the off-lying islands extensive reefs project in every direction. The eastern entrance to the strait lies between I saki and Kusi saki, where it is 2¼ miles wide; but is divided into three channels by two extensive sandbanks named the Middle ground, and Tano bank.

KUSI SAKI, the north point of entrance to the strait, has a reef of rocks which dry at low water, extending one cable off its eastern part; at 1½ cables to the southward is a depth of 1¼ fathoms suddenly deepening to 5 fathoms. To the north-eastward of Kusi saki, at low water, an extensive sandy beach reaches for several miles, on which is situated the village of Toyo, and the ruins of a large military station, formerly the fortress of a powerful Daimio, the prince of Daisen or Nagato.

Kanziu and Manziu, are two islands, 6½ cables and 1½ miles respectively, E. by N. of Kusi saki. They are both covered with trees and should not be passed within 2 cables. Kanziu is about 40 feet high and flat; a boulder rock 4 feet high, together with a small rock (which covers) immediately to the north-east of it, lie about 150 yards from the south point of Kanziu, and at low water, a narrow spit of sand dries one cable out from the northern point of the island. Manziu, 198 feet high, is the eastern of the two islands.

Middle Ground.—Midway between Kusi saki and I saki, a shoal bank of sand extends 1¾ miles in an east and west direction, being from one-half to 3 cables in width, and has depths varying from one to 3 fathoms on it. The eastern extreme is nearly 1¼ miles N.N.E. from I saki lighthouse. This bank forms in two large shoal patches with a smaller patch between, and is marked by two buoys.

A red buoy, with staff and cage 10 feet above water, is moored in 3 fathoms on the western patch, and 4¼ cables from the western extreme of the Middle ground; with Kusi saki bearing N.N.W. ¾ W. distant one mile; and I saki lighthouse S.E. by S. ¼ S., $1\frac{4}{10}$ miles.

A black buoy, with staff and cage 10 feet above the water, is moored in 3 fathoms, nearly one cable to the southward of a depth of one fathom on the eastern patch of the Middle ground, and 3 cables westward of the eastern edge of the shoal with I saki lighthouse bearing S. ½ W. distant one mile; and Kusi saki N.W. ½ W. 1 $\frac{7}{10}$ miles.

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* *See* Admiralty chart:—Simonoseki strait, No. 532; scale $m = 2 \cdot 25$ inches.

This bank divides the strait into two channels, that to the northward (North channel) carrying the deepest water.

Tano bank.—The western extreme of this bank, on which is a depth of 4 fathoms, lies 5 cables E. ¾ N. from Mozi saki, from which position it extends in an easterly direction for nearly one mile; with depths varying from 2¾ to 4 fathoms on it.

This bank divides the portion of the strait lying southward of the Middle ground into two channels. Neither of them is to be preferred to the North channel (north of the Middle ground); but of the two the channel north of the Tano bank (Middle channel) is the better.

Anchorage, in 5 fathoms, may be found on the north side of the Tano bank (which shoals suddenly from 7 to 4 fathoms), well clear of the tide race through the strait.

KANABUSE (Fisherman rock).—This dangerous rock lies 11 cables N.E. by E. ¾ E. from Mozi saki. It is 120 yards long N. by W. and S. by E., has only 4 feet on its southern end, 12 feet on its northern end, and 5 fathoms between at low-water springs; the south end has the appearance of two large square blocks of stone 10 yards apart. There are 6 fathoms close to its south, east, and west sides; and 10 fathoms (sandy bottom) a short distance northward of the 12 feet patch.

Buoy.—A buoy, coloured black and white in horizontal stripes, and carrying a staff and cage 10 feet above the water, is moored in 9 fathoms, half a cable south of the southern rock; with Mozi saki bearing S.W. by W. ¾ W., distant 1 2/10 miles; and I saki lighthouse S.E. by E. ¾ E. distant 2 2/10 miles.

A large clump of trees on Take saki (the south point of Simonoseki town) in line with Mozi saki bearing W. by S. ¾ S., leads between Kanabuse (Fisherman rock) and Tano bank.

The NORTH CHANNEL, northward of the Middle ground is, with the exception of the Kanabuse, clear of danger.

The MIDDLE CHANNEL, south of the Middle ground, and north of the Tano bank, carries 4 fathoms at low-water springs. Hino yama kept bearing W. ½ N. until the clump of trees on Take saki comes in line with Mozi saki, leads through. This channel is well marked by buoys, and can be used at all times, except by vessels drawing over 22 feet water; these must pass through only at high water. The shoalest part of the Middle channel is about 3 cables in breadth, and is situated to the southward of the *red* buoy near the west end of the Middle ground.

The SOUTH CHANNEL, southward of the Tano bank, is the narrowest, although the tides here are not so strong as in the North and

Middle channels. It carries a depth of not less than 5½ fathoms at low water.

MOZI SAKI.—Simonoseki strait is narrowed to 3 cables between this point (which is the extreme of a promontory at the north end of Kiusiu), and the eastern end of the town of Simonoseki. The extreme of Mozi saki is a low hill, but there is immediately over it a hill 583 feet high, with some tall trees on its summit.

Between Mozi saki and the opposite shore of the strait the tide runs with great velocity, and with but a short interval of slack water between the change of stream.

Telegraph.—A submarine cable is laid from the east side of Mozi saki to the opposite shore of the strait, its position being marked by a small house and beacon on each shore, and a buoy painted black and red in vertical stripes, moored a short distance from the beach.

Hino yama, a peak with three summits, the highest of which is 933 feet above the sea, is conspicuous on the mainland of Nipon, opposite Mozi saki.

WHITSHED BAY, on the south side of Mozi saki, affords good anchorage in from 5 to 7 fathoms, with Mozi saki and Observation point in line, or a little open, bearing North; and Mozi village bearing East. Here the heavy ships of the allied fleet anchored after the reduction of the batteries in September 1864; the ships, especially those anchored inshore, rode to an eddy tide during the westerly stream through the strait, and during the run of the eastern stream, the strength of it was entirely avoided.*

An extensive shoal bank, with 3 to 4 fathoms water, fills up the whole of the southern and outer part of Whitshed bay, having depths of 6 fathoms between it and the shore. The shoalest part of this bank (3 fathoms) lies 3¼ cables S.W. ½ W. from the north point of Whitshed bay. Kusi saki in line with Mozi saki, bearing N.E. ¼ E., leads north-west of this bank.

SIMONOSEKI, is an important town from its position at the entrance of the Inland sea. It is formed of a single principal street extending for nearly 2 miles, at the base of some low steep hills, along the shore of Nipon. Its most conspicuous buildings are the telegraph and custom houses, and a bungalow immediately behind them on the side of a hill a little over the town. The telegraph office is a white square stone building at the east end of the town. The Japan Mail Company steam vessels call here once weekly.

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* George Williams, Master, R.N., H.M.S. *Euryalus.* Staff-Commander S. C. Tracey reports Whitshed bay to be suitable as an anchorage for ships of moderate draught only, and to be too confined for those of a larger class.

Supplies:—Beef, vegetables, and fruit can be obtained at moderate prices. The coal, which is much used here in the forging of nails, is not of good quality. Water of excellent quality can also be obtained.

Anchorage.—If intending to anchor off the town of Simonoseki, take up a position well below the custom-house in 6 to 10 fathoms, out of the tides, which are very rapid through the narrows, forming strong eddies along the shore during the western stream, and sometimes causing vessels to foul and drag their anchors; there is also great risk of collision with the junks, which frequently drift quite unmanageably through the strait.

Tides.—It is high water, full and change, at Simonoseki (Mozi saki) at 8h. 30m.; springs rise 8 feet, neaps 6 feet. The western stream (flood) makes at 2½ hours before high water, and the eastern stream 2½ hours after high water, so that the western stream continues 5 hours and the eastern 7 hours. There is no slack water during spring tides.

Off Mozi saki the velocity of the tidal streams at springs is from 7 to 8 knots, and at neaps 3 to 4 knots; the current is at its full strength for 3 hours of each tide. There are heavy overfalls in the eastern part of the strait during spring tides.

HIKU SIMA, lying at the western entrance of Simonoseki strait, is of irregular shape, over 3 miles in extent north and south, and has a conspicuous smooth green hill 365 feet high on its north point. Its north-west point forms a long narrow peninsula, the highest part of which is only 80 feet.

Cape Sizikuts, the north-west point of Hiku sima, is a low rocky promontory, 58 feet high. The coast from this cape, south-westward 9 cables, to Hamo islet is indented with small bays, the cliffs along it being of a yellowish red colour. The southern part of the island is wooded, and Entrance head, its south-west point, a wooded bluff 372 feet high, is the summit of the island.

Ringdove rock, lying 1⅓ cables W.N.W. from west point of Takenoko island, and 2½ cables N.W. of cape Sizikuts, is an isolated patch about 40 yards long and 15 yards broad; it has a depth of only 7 feet on it, with from 5 to 7 fathoms round it.

Caution.—As outlying rocks are said to exist northward of the west point of Takenoko island, extending some distance from the shore, vessels are cautioned that when passing that point and cape Sizikuts, they should not approach the shore within a distance of 3 cables.

Fuku ura, a small harbour on the south-west shore of Hiku sima, is nearly 2 cables wide at its entrance, and extends 7 cables in a north-east direction. It is shallow and only suited as an anchorage for junks in 6 to 12 feet at low water.

LIGHT.—A white light is shown occasionally at night from a lantern about two-thirds up the hill on the north point of entrance to Fuku ura.

Takenoko, a small island immediately north of cape Sizikuts, is only separated from it by a boat channel a few yards wide. This island lies in the fairway of vessels, and as dangers extend a quarter of a mile from low water mark, it should not be approached nearer than 4 cables.

KOSEDO STRAIT, is a narrow passage winding round the north end of Hiku sima, which it separates from the mainland of Nipon; it is only half a cable wide at its west entrance, and shoals to 7 feet off the town of Simonoseki.

Ganru sima is a small island lying one quarter of a mile off the east side of Hiku sima. Its summit, 62 feet high, is over the north point, and reddish coloured cliffs extend along the east side of the island. The south point is steep-to and may be passed at a distance of one cable. Inside a line joining the south end of Ganru island with the east point of Hiku sima, there is shoal water; and also west of a line joining the south end of Ganru island with the Custom house point at Simonoseki.

Yodsibi rock, lies E.N.E. 4½ cables from Kibune point, and will be avoided by keeping near the Hiku sima shore. It uncovers 4 feet at low water springs, and is marked by a red conical stone beacon, 30 feet high and 8 feet in diameter at the base, with a plain rounded top. The rock may be passed on either side, but the western channel is preferable, it being twice the width of the other.

Narusi rock, situated a quarter of a mile S.W. of Kibune point the south-east point of Hiku sima, and 1½ cables off shore, uncovers before half ebb and is marked by a white conical beacon, 8 feet in diameter at its base, 20 feet in height; and surmounted by a pear-shaped top. To pass outside it, keep Hino yama the wooded bluff hill over Simonoseki, open of Kibune point.

Manaita rocks, lying nearly 2 cables south of Entrance head (Hiku sima) uncover towards low water. A conical beacon, coloured black and white in horizontal bands, 8 feet in diameter at its base, and 20 feet in height, surmounted by a ball 3 feet in diameter, is erected on the largest of these rocks.

The east extreme of Kanasaki sima in line with cape Sizikuts the west extreme of Hiku sima bearing N.N.W. ¼ W., leads 1½ cables westward of Manaita rocks, and is the leading mark for the channel between Hiku flat and Hamo bank.

Hiku flat, lying W.N.W. one mile off Entrance head, is a bank of sandstone rock, 8 cables long and 3 cables broad; with 13 feet water on it.

Buoy.—A red buoy surmounted by a circular cage the top of which is 12½ feet above the water, lies in 9 fathoms at 8 cables N.W. ½ W. from the beacon on Manaita rocks.

KOKURA.—The town and ruins of the fortress of Okasawa, Prince of Sakio, stands on the shore of Kiusiu, south of Hiku sima, at the mouth of a small stream named the Ogawa.

Kokura ledge, a flat of sand and rock, with shoal patches on it, fronting the low shore of Kiusiu south of Hiku sima, extends from one to 2 miles off shore, gradually deepening to 3 fathoms at its outer edge, which is steep-to.

Hamo bank, on which there is a depth of 3½ to 5 fathoms at low water, lies 4 cables north-east of Hiku flat, and extends 6 cables in a north-west and south-east direction, forming a channel 3 cables wide between it and the shoal bank extending from the shore of Hiku sima.

Anchorage may be obtained in 6 fathoms, on the northern shore of this channel, 3 cables from the shore of Hiku sima.

Directions.—Through SIMONOSEKI STRAIT from the EASTWARD by the North Channel to Mozi saki.—Approach the strait with Isaki lighthouse bearing N.W. ¾ W., or at night keep the white light in sight, until the centre of Manziu, 198 feet high, the easternmost wooded island on the north side of the strait, bears N. by W. ½ W., when steer for it on that bearing. This course will lead eastward of the Middle ground, in not less than 6 fathoms at low water.

When the south extreme of Kanziu, a low wooded islet 8 cables west of Manziu bears W.N.W., alter course for Hino yama a high wooded peak 921 feet high (the southern termination of the range eastward of Simonoseki town), which will then bear W. ¾ S. By steering for it on this bearing, the vessel will pass northward of the Middle ground in about 8 fathoms at low water.

When the red buoy on the Middle ground is in line with Isaki lighthouse bearing S.E. by S. ¼ S., alter course to S.W. by W. ¼ W. for Mozi saki, with the centre of Manziu island bearing N.E. by E. ¼ E. astern. This course will lead one cable eastward of Fisherman rock buoy, painted black and white in horizontal stripes. When about 3 cables from this buoy, or when Isaki lighthouse bears S.E. by E., edge to the southward to bring Mozi saki in line with the clump of fir trees on Take saki (the south point of Simonoseki town) bearing W. by S. ¾ S. This mark leads one cable south of the Fisherman rock buoy, and north of the Tano bank, to Mozi saki.

The north channel, however, is but seldom used, and should never be attempted by night, as the tides are very strong. Vessels drawing 22 feet and over, arriving at Isaki towards sunset, or at or about low water, are recommended to wait until daylight, or until the tide suits for taking the Middle channel, south of the Middle ground.

Through the Middle Channel to Mozi saki.—Steer to pass I saki lighthouse at about half a mile, and thence towards the red buoy on the western edge of the Middle ground, on a N.W. ½ W. bearing; and when about 3 cables from it, or when the centre of Manziu islet bears N.E. ¾ N., alter course quickly to W. ½ S., keeping the black buoy on the east end of the Middle ground bearing E. ½ N. astern, until Mozi saki is in line with the clump of trees on the south point of Simonoseki town, bearing W. by S. ¾ S.; when steer for it as before directed, to pass northward of the Tano bank, and thence to Mozi saki.

Should the buoys not be in position—from abreast of I saki lighthouse steer towards Kusi saki on a N.W. ½ N. bearing, until Hino yama bears W. ¾ N. when steer for it, keeping it on that bearing until Mozi saki is in line with the clumps of trees on Take saki, when proceed as before directed.

From Mozi saki westward.—After rounding Mozi saki at 1½ cables distant (about mid-channel), haul to the south-west, steering S.W. ¼ S. for the south end of Ganru island—remembering that Kusi saki in line with Mozi saki bearing N.E. ¼ E., astern, clears the shoal banks in Whitshed bay—and when the telegraph office (the first white stone building at the east end of Simonoseki town) bears North, or Hino yama bears N.N.E. ½ E., alter course to S.S.W. ½ W.; this will lead in 8 to 10 fathoms, to abreast Kibune point, passing the south end of Ganru sima, which is steep-to, at 2 cables distance; and in mid-channel between the red beacon on Yodsibi rock which is left on the port hand, and Kibune point.

From abreast Kibune point steer S.W. by S. until the white beacon on the Narusi rock is abeam, when a S.W. ¼ W. course, with Yodsibi red beacon bearing N.E. ¼ E. astern, should be continued until Shirasu lighthouse is in line with the south-west extreme of Hiku sima, bearing N.W. ¼ W., which will lead 1½ cables westward of Manaita rock beacon, and between the Hiku flat and Hamo bank; passing one cable eastward of the red buoy on the south-east edge of the former.

When about 3 cables past the red buoy, alter course to the westward with the south-west extreme of Hiku sima (Entrance head) in line with the next peak 1,261 feet high, south-west of Clump hill, bearing S.E. ¼ S.

This mark kept on, astern, leads 4 cables westward of cape Sizikuts; and when Rokuren lighthouse bears N. ½ E. steer for it on that bearing, to clear the foul ground on the west side of Takenoko sima. When passing that island on no account bring the lighthouse northward of the above bearing, as from the western edge of the foul ground the lighthouse bears North.

Rokuren lighthouse bearing N. by E. ½ E. clears the shoal ground eastward of Wakura and Kanasaki sima, islands lying south-west of Rokuren.

Steer to pass round the north point of Rokuren at about half a mile, and thence proceed to the north-west, with Smooth hill, on Hiku sima, in line with the north extreme of Rokuren bearing S.E ½ S., or at night keep Rokuren light in sight; this will lead three-quarters of a mile eastward of the red buoy moored in 5 fathoms, on the outer edge of a reef which extends about one mile northward of Ai no sima.

Channel westward of ROKUREN.—Should it be desired to pass westward of Rokuren and the islets in its vicinity, instead of steering for Rokuren lighthouse on a N. ½ E. course, as above directed, continue on the previous course (N.W. ⅜ N.) towards Ai-no sima, and when the west extreme of Kata sima comes in line with the north extreme of Rokuren, bearing N.E. by E., steer N. by E. ¼ E., which will lead 3½ cables eastward of Koshiki iwa (Square rock). Continue on this course until Smooth hill, on Hiku sima, is in line with the north point of Rokuren bearing S.E. ½ S.; when haul to the north-westward with this mark on astern, as before directed.

Channel south of SHIRASU (Low reef).—If intending to pass through the channel south of Shirasu lighthouse, proceed as above directed, westward of Rokuren and its neighbouring islets, towards Ai no sima, until the south extreme of U-ma sima bears E. ¾ S., when alter course to W. ¾ N. This point kept on the above bearing, astern, will lead over the bank in not less than 16 feet at low water spring tides, passing 8½ cables southward of the lighthouse on Shirasu reef, and 3 cables to the southward of the foul ground which extends 1½ miles in a S. by E. direction from the south Siro sima. When the summit of north Siro sima bears North, steer W. ½ S., with Shirasu lighthouse astern: this course continued for 15 miles will take the vessel up to Kosime no Ōsima (Wilson island). This route should, however, only be taken by small vessels.

CAUTION.—The mariner is reminded that the tidal streams set through this strait with great velocity (pages 435 and 445), and that great caution is necessary for the safe navigation of the ship, to avoid the many dangerous rocks and banks with which it is encumbered. It is therefore recommended that vessels should anchor, if the tide be not favourable on arrival at either entrance, and that they should pass through the strait as near the time of slack water as is possible.

Anchorage may be obtained at the western entrance to the strait, eastward of Hamo bank, in 8 to 10 fathoms; with Wakura sima in line with cape Sizikuts.

The WESTERN ENTRANCE to the Seto Uchi, is at its outer part 35 miles across, being formed by the west coast of Nipon, which trends south for 25 miles from Kado sima, and the north coast of Kiusiu taking an easterly direction for the same distance from Kosime no Ōsima (page 537). At the angle where these coasts meet within 3 miles, is the large island of Hiku sima, above described, south of which is the fairway and entrance to Simonoseki strait.

IWAYA POINT, low and rocky, with projecting ledges, is at the termination of a sandy bay 5 miles wide. A wooded hill 1,100 feet high, conspicuous from the offing, with a round gap in its summit, rises 5 miles S.W. by W. ½ W. of Iwaya point.

The Kiusiu shore eastward from Iwaya point is generally low and skirted with sandstone ledges, but the back ranges are from 2,000 to 4,000 feet in height. The shore of Nipon is higher, but its hill ranges are lower, or from 1,000 to 2,000 feet.

SIRO SIMA.—These two islands, 6 cables apart, lie W. by N. ½ N. 16 miles from the outer point of Kosime no Ōsima and nearly 5 miles N.N.E. from Iwaya point. North Siro sima, the north-eastern island, half a mile long and 400 yards broad, is densely wooded: its summit, 447 feet high, of rounded outline is over the southern part. The north point is a perpendicular cliff 365 feet high. A shoal spit extends 4 cables off its south point.

South Siro sima, the south-west island, half a mile long in a W.N.W. and E.S.E. direction, and from 100 to 200 yards broad, is indented: its eastern sharp peak is 282 feet high.

Round and Pillar rocks.—Round rock, 124 feet high, lies 1½ cables from the north point of North Siro sima; and Pillar rock, 85 feet high, about three-quarters of a cable from the point.

S. Siro sima reef—Shoal water extends from the eastern point of S. Siro sima in a S. by E. direction for a distance of 1½ miles. From the southern end of this rocky shoal (on which is a depth of 2¼ fathoms) the lighthouse on Shirasu (Low reef) is in line with the south end of Ai-no sima, bearing East. The west point of the island is steep-to.

A rocky patch, of some extent, with less than 2 fathoms on it, lies 3 miles S. by E. of the sharp east peak of south Siro sima. There are usually heavy overfalls on this patch.

MASUI SIMA, lies 6 miles N.E. by N. of north Siro sima, and 3 miles from the shore of Nipon, off cape Morotzu, the hills over which are 1,000 feet high. The channel between is free from known danger.

The northern part of this island is a triple-topped bluff, 900 feet high; on the west coast (about the middle) there is a very sharp peak; the southern part of the island is lower, and terminates in a bluff. Masui sima is bold-to on all sides, except at its south point, off which reefs extend one cable. One mile E.S.E. of the south bluff is a small black rock, 6 feet high, which should not be approached too closely.

AI-NO SIMA is a low, flat island, 84 feet high, covered with trees one mile in length N.N.W. and S.S.E., and one quarter of a mile broad. Off its north point are two small green islets each 30 feet high, nearly joined to Ai-no sima, at low water, by shelving rocks. To the northward of the western of these islets, at 3 cables distance, is a low reef that covers at high water, 2 cables eastward of which is a group of small rocks always visible.

Buoy.*—Shoal water extends half a mile to the northward of the above mentioned low reef, the outer edge being marked by a conical *red* buoy surmounted by a cage, 15½ feet above the water, moored in 5 fathoms (low water); Shirasu lighthouse bearing S.S.W. distant 2$\frac{2}{10}$ miles. Vessels should pass to the northward of this buoy.

On the southern point of Ai-no sima is a grassy mound 10 feet high from which shelving rocks extend 1½ cables to the southward, shoal water continuing nearly 4 cables in the same direction.

Shirasu (Low reef) lying 1¼ miles to the south-west of Ai-no sima is nearly 5 cables in extent, north and south, and 4 cables broad. The centre of the reef is a patch of shingle and sand, 380 feet long by 75 feet broad, only a few feet above high water, and on which is a lighthouse and flagstaff; on the eastern side is a small wooden pier.

LIGHT.—From a lighthouse situated on the south end of Shirasu, painted *black and white* in horizontal stripes, is exhibited, at an elevation of 44 feet above the sea, a *fixed red* light visible in clear weather from a distance of 10 miles.

Koshiki iwa (Square rock), lying E.N.E. 7 cables from the southern point of Ai-no sima, is a small square rock 12 feet above high water, with shelving rocks extending one cable to the southward; and 2¾ and 3¾ cables to the north westward are rocks awash at low water. The east side of Koshiki iwa is clear of danger there being a depth of 5 fathoms at a little over one cable's length from the shore, and 10 fathoms at 3½ cables off; the west side is foul and the channel between this rock and Ai-no sima should not be attempted.

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* Reported to be not in position (1883).

Soundings.—The depths between Shirasu and Ai-no sima vary from 3½ to 6 fathoms at low water. Vessels drawing over 12 feet water should not use this channel.

ROKUREN ISLAND (Mutsure), 2 miles S.E. by E. of Ai-no sima, has on its table land a large and conspicuous clump of trees, 340 feet above the sea, which is visible after rounding Kosime no Ōsima (Wilson island), when it will bear about E. ½ N. A spit extends 2 cables from the north point of the island, but the east side is bold.

LIGHT.—From a lighthouse 34 feet high, situated on the eastern extreme of Rokuren, at an elevation of 89 feet above the sea, is exhibited a *fixed* white light, seen between the bearings of S.E. ¾ S. (through South and West) and N. by E. ½ E.; in clear weather it should be visible from a distance of 12 miles.

The light when first seen, bearing S.E. ¾ S., leads half a mile from the shoal ground north of Ai-no sima.

U-MA SIMA GROUP, consisting of U-ma sima, Kanasaki sima, Wakura sima, Kata sima, and several smaller islets and rocks, lies to the south-west of Rokuren, to which they are joined by a shoal bank; they are all of about the same height (70 to 80 feet).

Anchorage.—There is a small anchorage on the south-east side of Masui sima, with the south bluff bearing S.W. There is anchorage also along the Nipon shore, east of Ai-no sima and Rokuren, in 7 and 9 fathoms, but the coast should not be approached within half a mile, as it is fringed with reefs; northward of this the reefs extend a mile off shore. If, however, there be sufficient daylight to get round Rokuren, it is recommended to do so instead of anchoring outside for the night, and bring-to on the bank half a mile south of the U-ma sima group, in 6 or 7 fathoms.

Tides.—It is high water, full and change, at the western entrance to Simonoseki strait at 9h. 0m.; springs rise about 4 feet, neaps 1¾ feet.

Directions.—If bound to Simonoseki from the westward, pass about one mile north of Kosime no Ōsima, and steer E. by N. ½ N. for the north point of north Siro sima, which pass at half a mile; then steer East, taking care not to bring the north point of north Siro sima to bear northward of West, till the lighthouse on the eastern extremity of Rokuren island opens out bearing S.E. ¾ S., or at night until the light is sighted, so as to clear the reefs off the north point of Ai-no sima. A S.E. course will then lead up to Rokuren, which can be rounded at 3 cables, when steer S. by W. to pass cape Sizikuts, the west point of Hiku sima; or at night keep Rokuren light in sight, bearing N. ½ E., taking care not to bring it to bear eastward of N. by E. ½ E.

Southern channel.—From the westward.—Rounding Kosime no Ōsima at about one mile steer E. ½ N., which will lead midway between the coast and south Siro sima, and towards Shirasu lighthouse, when having sighted the light keep it on an E. ½ N. bearing (to clear the foul ground which extends 1½ miles in a S. by E. direction from the east extreme of south Siro sima); and when the summit of north Siro sima bears North, alter course for the south end of U-ma sima, bearing E. ¾ S.; this course will lead 8½ cables southward of Shirasu lighthouse, and over the banks in not less than 16 feet at low-water spring tides. Continue the above course (E. ¾ S.) until the north end of Rokuren island is in line with the west end of Kata sima, bearing N.E. by E., then steer to the south-eastward for the entrance to the strait with Entrance head (the south-west point of Hiku sima) in line with the peak immediately south-west of Clump hill, bearing S.E. ⅜ E. until the *red* buoy on the Hiku flat is passed, when proceed as directed below.

Through SIMONOSEKI STRAIT from the WESTWARD.—After passing the *red* buoy off the northern extreme of Ai-no sima, steer to south-east by day, with the smooth hill on Hiku sima in line with the north extreme of Rokuren, bearing S.E. ½ S.; or by night, when the light is sighted bearing S.E. ¾ S., steer for it. Round Rokuren, at about half a mile distant, and proceed between Takenoko and Wakura sima (taking care to keep the lighthouse on Rokuren between the bearings of N. ½ E. and N. by E. ½ E.), and when Entrance head is seen in line with the peak (1,261 feet high) immediately south-west from Clump hill, bearing S.E. ⅝ S., steer for it. These marks kept on will lead 4 cables westward of cape Sizikuts, and to abreast the red buoy on the Hiku flat; whence by keeping the east extreme of Kanasaki sima in line (astern) with cape Sizikuts bearing N.N.W. ¼ W., the vessel steering S.S.E. ¼ E. will pass 1½ cables westward of the black and white beacon on Manaita rock. Continue on this leading mark a little past the beacon until the "Rocky Eminence" (a peak 1,193 feet high on the eastern shore of the strait) is in line with Kibune point bearing E. by N. ¾ N., when alter course to E. by S., and when Mozi saki is open of Kibune point bearing N.E. ½ N. steer towards the red beacon on Yodsibi rock bearing N.E. ¼ E.; this course will lead past the white beacon on Narusi rock and up to abreast of Kibune point.

From Kibune point, steer towards Hino yama, bearing N.N.E. ½ E.; this course will lead up to abreast of the town of Simonoseki, and when Kusi saki is seen open of Mozi saki, the vessel's course may then be altered to pass midway between Mozi saki and the mainland.

Caution.—Vessels drawing over 22 feet arriving at Mozi saki at or near low water, or if the western stream be running strong, should anchor in Whitshed bay until the tide suits to proceed eastward through the Middle channel. If continuing on were imperative, the North channel should be used, as at low water the Middle channel has only from 24 to 27 feet water in it.

Smaller vessels can, however, use the Middle channel at any time of tide, but only in case of great emergency should they attempt to pass through against the strength of the stream, which at spring tides attains (in the vicinity of Mozi saki) a rate of from 5 to 7 knots an hour. Great care is also necessary to avoid the numerous junks tiding through.

By the North channel.—After passing Mozi saki, steer to the eastward, with that point in line with the clump of trees on the south point of Simonoseki town bearing W. by S. ¾ S.; this mark will lead north of the Tano bank, and one cable to the southward of Fisherman rock buoy (black and white horizontal stripes) from abreast of which steer towards the centre of Manziu, (the easternmost island at the eastern entrance to Simonoseki strait) bearing N. E. by E. ¼ E.; and when I saki lighthouse is seen in line with the red buoy near the western edge of the Middle ground bearing S.E. by S. ¼ S., alter course to E. ¾ N., with Hino yama bearing W. ¾ S. Hino yama kept on this bearing (astern) will lead a vessel north of the Middle ground in not less than 8 fathoms at low water. When the centre of Manziu bears N. by W. ½ W. steer S. by E. ½ E., taking care to keep Manziu on the former bearing (astern) which will lead eastward of the Middle ground in about 6 fathoms, at low water. There is shoal water a short distance eastward of this line.

When I saki lighthouse bears N.W. ¾ W., haul to the south-eastward into the Inland sea; and at night keep the *white* light in sight to avoid the shoal ground off Moto yama.

By the Middle channel.—The Middle channel is most generally used, as it is well marked by buoys. After passing Mozi saki steer, as before directed, to the eastward with the leading mark (Mozi saki in line with the clump of trees on the south point of Simonoseki town) on astern, and when abreast of Fisherman rock buoy, steer towards the black buoy, near the eastern edge of the Middle ground on an E. ½ N. bearing, until I saki lighthouse bears S.E. by S., when alter course to S.E. ½ E. to abreast of the lighthouse, and thence steer to bring the lighthouse to bear N.W. ¾ W., and proceed into the Inland sea (steering S.E. ¾ E.) with the lighthouse on that bearing.

Should the buoys be removed; from Mozi saki steer to the eastward as before directed to pass south of the Fisherman rock until I saki lighthouse bears S.E. by E. ¼ E.; then alter course to E. ¾ S. with Hino yama on astern, and when the lighthouse bears S.E. by S. haul to the southward into the Inland sea.

CHAPTER VII.

JAPAN ISLANDS.—THE GOTO ISLANDS, AND THE WEST COASTS OF KIUSIU AND NIPON.

VARIATION in 1884; 4° to 5° West.

The GOTO ISLANDS.*—This mountainous chain of many islands, lying between the parallels of 32° 34′ and 33° 20′ N., is 50 miles in extent in a N.E. and S.W. direction, and from 5 to 20 miles in breadth. The chain consists of nine principal islands forming six channels. The principal islands are Uku sima, the northernmost; Nosaki sima; Nakadori; Wakamatsu; Ojika; Naru sima; Kaba sima; Hisaka sima; and Fukai, the southernmost.

The channels are the Ojika seto (Kosaka channel of old charts), between Uku sima and Ojika; a passage between Nosaki sima and the north point of Nakadori; Nakadori seto, between Nakadori sima and Wakamatsu; Taki gawara seto, between Wakamatsu and Naru sima; Naru seto, between Naru sima and Hisaka sima; and Tanno ura seto, between Hisaka sima and Fukai. All these channels with the exception of the narrow and tortuous passage between Nakadori and Wakamatsu have now been surveyed.†

UKU SIMA is 3¼ miles long north and south, and 4½ miles broad; in the centre are two peaks of nearly the same height, the northern 842 feet high, being the higher. The shores of this island are indented with several small bights, which afford shelter for boats.

Kamo se, a small islet 60 feet high, lies 2 cables off the west point of Uku sima; in the passage between are numerous rocks.

Kura no hana, the northern point of Uku sima, is low, with detached dangers extending one-third of a mile to the northward, having 16 to 19 fathoms close to them.

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* *See* Admiralty charts:—West coasts of Kiusiu and Nipon, No. 358; scale, $m=0 \cdot 13$ of an inch; and Nagasaki to Karatsu with the Goto islands, No. 359; scale, $m=0 \cdot 33$ of an inch.

† The description of, and directions for, the Goto islands, are principally compiled from the remarks of Commander P. Aldrich, R.N., and Staff Commander W. Pearce, H.M.S. *Sylvia*, 1876-1879, together with those of J. Richards, master commanding H.M.S. *Saracen*, 1855. The west coast of Kiusiu is from the remarks of Commanders C. J. Bullock, E. W. Brooker, 1866-69, and P. Aldrich, 1879.

Kamo se in line with the summit of Hira sima bearing S.W. ½ W., or the summit of the highest Koshi no se islands bearing E. by S. ½ S., leads one third of a mile to the northward of the dangers off Kura no hana.

Caution.—In passing Uku sima by night it is advisable to give the northern shore a wide berth, as the extremity of the land is low, and the tide runs very strong in this locality.

Koshi no se, a group of three small islets, lies 2 miles east of Kura no hana; the centre islet being 200 feet high. From it the eastern islet, 98 feet high, is distant 3¼ cables; and the western, 54 feet high, about three-quarters of a cable. A small rock, covered at times, with 5 to 11 fathoms close around it, lies one cable to the south-westward of the eastern islet.

Sunken rocks.—About half a mile westward of Koshi no se is a dangerous patch of rocks, on which the sea breaks occasionally, having from 6¾ to 14 fathoms close around them. In the channel between these rocks and Uku sima, there is a depth of 11 fathoms.

The summit of Kuromo se bearing S. by E. ¾ E., will lead a quarter of a mile west of these dangerous rocks.

Naga saki hana, the eastern point of Uku sima, is low and bordered with detached rocks which dry in some places to a distance of 2 cables from it; shoal water extending to the eastward 2 cables from their outer edge. At half a mile from the point there is a depth of 10 fathoms.

When passing Naga saki hana, the summit of Kuromo se must not be brought to bear eastward of S. by E. ¾ E.

Kuromo se, situated 2½ miles to the south-eastward of Uku sima, is a cluster of small rocks 1¾ cables in extent, and 50 feet high, with deep water surrounding them.

Maye-go sima, an islet, 300 yards long, and 125 feet high, lies 3 cables off the south-east part of Uku sima; it is steep-to all round, but vessels should invariably pass to the southward of it. At three-quarters of a mile N.W. by N. from this islet is a sandy beach, on which is situated a village (Tai-ra mura); junks are sheltered here by a small pier extending from the east end of the beach.

Tera sima, about 120 feet high, is an irregularly shaped island lying off the south-west part of Uku sima. The ridges of Tera sima appear flat, and in the eastern portion of the island, on the top of a ridge, is a remarkable tree. The shores of the island are principally composed of lava, the northern point, 90 feet high, being narrow and projecting. There is a narrow navigable channel between Tera sima and Uku sima.

Ikadzuchi, are 2 small rocks, dry at low water, lying 1¼ cables N. by W. from the north point of Tera sima.

The high water marks of the east extreme of Ojika and the west extreme of Uku sima in line, bearing S.S.E. lead one cable eastward of Ikadzuchi.

Nezumi sima, a small islet joined at low water to the south-east point of Tera sima, has on its summit a tall tree.

KO NO URA, situated between Uku sima and Tera sima, has depths from 4¼ to 13 fathoms, and is open only to winds from the southward; in the centre of the harbour there is a bank with 4¼ to 5 fathoms water on it.

Anchorage.—The best berth is in 10 fathoms, north of the bank in the centre of the harbour, with Nezumi sima tree bearing S.S.W., and the west end of Uku sima W. ½ N.; anchorage may also be obtained in 13 fathoms south of the bank, with the north end of Madara sima in line with the south end of Nezumi sima, bearing S.W. by W. ½ W.; and the north point of Tera sima seen just open to the westward of Uku sima west point, bearing N.W. ¼ W.

Directions.—Entering Ko no ura from the southward, steer towards the north point of Tera sima, seen just open to the westward of Uku sima, bearing N.W. ¼ W.; and when the east end of No sima is in line with the east end of Nezumi sima, steer N.E. by E. for the anchorage. Caution, however, is necessary when approaching the narrow channel between Uku sima and Tera sima during flood tide, as it runs strong to the north-westward. This channel is only suitable for small vessels.

Supplies.—There are three villages on the Uku sima shore of Ko no ura, where fish, rice, vegetables, and poultry, may be obtained in small quantities. Pheasants abound in the northern part of Uku sima.

OJIKA SETO, formerly known as the Kosaka channel, is the strait south of Uku sima and Tera sima; it has in its centre a small black rock (Ai-no se) 16 feet in height, with deep water round it. The western entrance to this strait, between Tera sima and No sima, is 9 cables wide, but isolated dangers exist nearly one cable to the northward of No sima.

MU SIMA, 254 feet high, half a mile wide, and circular in shape, lies a little over one mile from the south end of Uku sima. The north, south, and west sides of Mu sima are steep-to, but shoal water extends one quarter of a mile to the southward of its eastern point.

A small islet, 28 feet high, having a single tree on its summit, lies just off the west part of Mu sima.

Directions.—Entering Ojika seto from the eastward, Kuromo se may be passed on either side, when steer to the westward between Uku sima and Mu sima. The summit of Hoage in line with the south end of Ai-no se, bearing W. ¾ S., leads 3 cables from the south shore of Uku sima, and when the north point of Tera sima is seen just open to the westward of

Uku sima west point, bearing N.W. $\frac{1}{4}$ W., steer towards it, which will lead into Ko no ura, when proceed to an anchorage as before directed.

If proceeding through Ojika seto from the eastward, after passing Ai-no se, steer to the westward with Kuromo se summit seen well open to the northward of Ai-no se, bearing East; this mark on astern leads through the centre of the channel between Tera sima and No sima. Tera sima can be passed at $1\frac{3}{4}$ cables distance, but No sima must be given a wide berth, and when passing the northern point of No sima the summit of Kuromo se should not be brought to the southward of Ai-no se.

Entering Ojika seto by the channel south of Mu sima, keep the eastern point of Nosaki sima in line with the point west of Eno sima bearing S.S.E. $\frac{1}{4}$ E. and steer N.N.W. $\frac{1}{4}$ W., which will lead clear of Kebuta rocks. When the north extremes of Kuromo se and Mu sima are in line bearing E. by N. $\frac{1}{2}$ N., alter course to N.W. $\frac{1}{2}$ W., which will lead one-third of a mile north of Ai-no se ; and when Ai-no se bears S.S.E. steer N.N.W. for the anchorage in Ko no ura.*

Entering Ojika seto by the channel between Nosaki sima and Ojika, remember that Nosaki sima is steep-to, but in passing the south-east point of Ojika care must be taken not to bring the north end of Nosaki sima to bear eastward of N.N.E. The north-east point of Ojika should be given a berth of at least a quarter of a mile, and after passing it, steer towards Ai-no se, leaving that rock on either side, and if intending to anchor in Ko no ura, proceed as before directed for the anchorage.

NOSAKI SIMA, half a mile south of Mu sima, is $3\frac{1}{3}$ miles long, north and south, with hills extending through the centre, the summit 1,142 feet high, being over the northern portion; in the middle of the island is a saddle-shaped hill about 200 feet high.

The western coast of Nosaki sima is steep-to, as is also the southern part of the eastern shore, but from Nokubi bay northward it is foul, and the point which forms the north shore of Nokubi bay should not be approached between it and Eno sima within half a mile.

Nokubi, the only bay in Nosaki sima, is open to the south-east, but affords sheltered anchorage with winds from all other quarters.

The northern point of Nosaki sima is wooded, and on the west side of the island, immediately under the summit, is a reddish coloured landslip.

The channel between the south-east point of Nosaki sima and Nakadori is $2\frac{3}{4}$ cables wide and clear of danger.

Eno sima, is a small islet, 89 feet high, lying a quarter of a mile from the north-east shore of Nosaki sima.

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* This channel is not recommended.

Kebuta, are two dangerous rocks, having less than 6 feet water on them, lying near each other, 1½ cables northward of the north extreme of Nosaki sima.

The eastern extreme of Nosaki sima in line with the point abreast Eno sima, bearing S.S.E. ¼ E., leads 1½ cables to the eastward of Kebuta; a bare hill, 193 feet high, over the north point of Ojika seen open a quarter of a point to the northward of the north-east extreme of Ojika, bearing W. ¼ S. leads 1½ cables to the northward.

OJIKA ISLAND, which forms the south side of Ojika seto, is 3½ miles long East and West, and 2¼ miles broad; it is separated from Nosaki sima by a navigable channel three-quarters of a mile wide. Off the southern and western portions of Ojika are several islands, the westernmost being 11¼ miles distant. The narrow channels formed by the islands adjacent to Ojika are only suitable for small vessels. On the east side of Ojika there are two conical hills, having clumps of trees on them, the northern 365 feet high, and the southern 222 feet. Half a mile westward of the latter is a hill 265 feet high, the south side of which rises perpendicularly from the sea. A bare hill over the northern point, 193 feet high, rises precipitously from the sea on its west side.

East bay, on the eastern shore of Ojika, is three-quarters of a mile deep, and nearly 7 cables wide at its entrance, the shore being fronted with shelving rocks that cover at high water. From Tonozaki, the south entrance point, rocks extend 2 cables in a northerly direction, and shallow water half a mile in a south-easterly direction. Kuszukuri, the north entrance point, has a large rock above water at the extremity of the shelving rocks which project from it.

The depth in East bay varies from 4 to 14 fathoms, the best anchorage being in about 8 fathoms, with the north point of Nosaki sima in line with the rock off Kuszukuri point, bearing E. by N. ½ N.; and the south end of Nosaki sima in line with Tan-ji islet, bearing S.S.E. ¾ E.

Directions.—Entering East bay from the southward, keep the west extreme of Shimomu sima in line with the north point of Nakadori sima, bearing S. by E. ½ E.; this mark leads clear of the shoal water off Tonozaki, and when the north point of Nosaki sima bears N.E., a N.W. by W. course will lead to the anchorage.

Approaching Tonozaki from the south-westward, the north extreme of Nosaki sima should not be brought to bear eastward of N.N.E. until the west point of Shimomu sima is in line with the north point of Nakadori sima, bearing S. by E. ½ E., when proceed as before.

Coming from the northward, keep the east point of Nosaki sima in line with the point abreast of Eno sima, bearing S.S.E. ¼ E., until the south-east point of Ojika bears S.W. ¼ S.; then steer to the southward, keeping midway between Ojika and Nosaki sima, and when the centre of a small reddish coloured landslip on Nosaki sima bears E. ¼ N. steer W. ¼ S., until the hill over the north side of the bay bears N.N.W. ¼ W., when a N.W. by N. course will lead to the anchorage.

The north-east point of Ojika should not be approached nearer than a quarter of a mile.

Tides.—It is high water, full and change, in East bay, at 8 h. 40 m.; springs rise 10¼ feet, neaps rise 2 to 4 feet.

Ko-guro sima, 57 feet high, situated 6¼ cables westward of the south-east point of Ojika, and 2 cables from the shore, is 400 yards long east and west, and 300 yards broad. This island is steep-to, except off its north-east point.

Anchorage can be obtained nearly midway between Ko-guro sima and the south-east point of Ojika, in 7¾ fathoms, sandy bottom; with the south extremes of Ko-guro sima and Kuro sima in line, bearing W. by S. ½ S., and the hill over the south-east point of Ojika N.N.E. ¼ E. This anchorage is sheltered from northerly winds, and the depths are even.

Kuro sima, 140 feet high, situated half a mile westward of Ko-guro sima, is nearly half a mile long east and west, and a quarter of a mile broad. It has a wooded peak over its east and west ends, both of which rise precipitously from the sea, the dark cliffs being remarkable when viewed from the southward and westward. On its south-west extreme is a pinnacle rock, 31 feet high and the southern side is steep-to; but the channel on the north side, which is one cable wide, has only 4 to 10 feet water in it.

Uu sima, 172 feet high, nearly 800 yards long, and bare, lies 7 cables to the westward of Kuro sima.

O sima, a quarter of a mile westward of Uu sima, rises perpendicularly on its north-west side; on its summit, 349 feet high, is a large clump of trees conspicuous from the southward and westward. The south side of O sima is steep-to, but a rocky ledge extends some distance from the south-west side, with shallow water between it and Mutsz-se, a cluster of small rocks, three-quarters of a cable in extent, and 5 feet above water, lying half a mile south-west of O sima.

Kuro se, a small black rock, 25 feet high, lies one mile S.W. ½ W. from the south extreme of O sima, and S. by W. 4 cables from Mutsz-se. The north-east side of Kuro se is foul, there being a patch of 2½ fathoms three-quarters of a cable from it; the west and south sides can be passed at a cable distance, in 16 fathoms.

Hoge sima (Arch rock), 1¼ miles W. ¾ S. from O sima, is 200 yards long north and south, having over the south end a conspicuous peak 200 feet high, which rises precipitously from the sea; over the northern point is a small peak joined to the southern portion of the rock by a perforated arch, which shows out prominently from the westward.

Yaburogi sima, 204 feet high, a quarter of a mile northward of O sima, is half a mile long east and west, and nearly half a mile broad, having at one cable from its west side a small cluster of rocks (Kai-se), 70 feet high, and semi-circular in shape.

Koro, a small island, a quarter of a mile north-eastward of Yaburogi sima, has on its west side cliffs 175 feet high. Between the north point of Koro and Ojika, a distance of 3 cables, are numerous dangers, which show at low water. Four cables eastward of Koro, is a small bare island 52 feet high.

Aka sima, 1¾ miles west of Ojika, is three-quarters of a mile long east and west, and 700 yards broad; the summit of this island (335 feet high) rises perpendicularly from the sea on its south side, and over the south-west point are several small hummocks which show out prominently from the southward and westward. Off the north-west part of Aka sima are a few small rocks above water; vessels should not pass the north and east sides nearer than 3 cables, but the south and west sides can be passed, in smooth water, at one cable distance.

Madara sima, 407 feet high, and nearly a mile in extent, is separated from the west point of Ojika by a channel one cable wide, in which is only a depth of 9 feet. Near the west side of Madara sima is a small rock 20 feet high. The north and west sides of this island can be passed at 2 cables distance.

Hoage (Arch rock), situated 4½ miles west from Madara sima, consists of two remarkable pinnacle islets, 150 yards in extent, bearing from each other East and West. The western islet is 167 feet high. The eastern islet, 120 feet high, has a hole through it, visible only from the northward or southward.

Danger.—A rock which dries 5 feet at low water spring tides (with 5 to 11 fathoms around it), and on which the sea generally breaks, lies to the northward of Hoage, with the summit of Biriyo sima in line with the west extreme of Hoage, bearing S.W. ¾ S., distant from the latter 6½ cables. There is a depth of 20 to 34 fathoms between this rock and Hoage.

Clearing mark.—The high water mark of the west extreme of O sima in line with the west point of Aka sima, bearing S.E. ¾ E., leads north-east of the above danger; and the east extreme of Hira sima in line with the west end of Hoage, bearing S.S.W., leads to the westward.

Kura sima, 381 feet high, lying nearly 3 cables to the southward of Hoage, is almost square, and a quarter of a mile in extent.

In the channel between Kura sima and Hoage there are depths of 17 to 20 fathoms, and no known dangers.

Biriyo sima, S.W. ½ W., 1½ miles from Kura sima, is nearly half a mile long north and south, about a quarter of a mile broad on its north side, and half a mile on its south. It has two peaks, the northern 470 feet and the southern 445 feet high, and may be known by being the highest island to the south-westward of Ojika.

Hira sima, 167 feet high, situated 6 cables south of Biriyo sima, is nearly half a mile long east and west, and is the southernmost island in this locality. Off its south point there is a small rock 29 feet high, and 4¾ cables to the westward of the south end lies a rock 24 feet high; there are other rocks near the west point, and rocky ledges extend to the northward from its north side, for a distance of 2 cables, with shoal water extending some distance to the northward of them.

Close to the east point of Hira sima there is a depth of 5 fathoms; one cable to the southward of the rock off its south point, 22 fathoms; in the centre of the channel, between Hira sima and the 24 feet rock to the westward, 12 fathoms. This rock (24 feet) is steep-to on its south side, but the soundings off its north and west ends are uneven, and a patch of 3 fathoms lies W.N.W. 2¼ cables from it.

Shiro se, 105 feet high, 13½ miles W. by S. from Ojika seto, is the westernmost islet in the northern portion of the Goto islands. It is divided into two pinnacles of nearly the same height, and appears as if cut in two from high water mark to the summit.

Off the south side of Shiro se is a small rock; and off the north side are several rocks above water extending nearly one cable to the northward, with deep water beyond. The east and west sides of Shiro se are steep-to, and can be passed at a distance of one cable.

Shaku shi (Hodge rock), a rock awash at low water, with deep water around it, lies N. ½ E., distant 4¼ cables from Shiro se; the north peak of Nosaki sima in line with Hoage, bearing East, leads 2 cables to the northward of Hodge rock.

Kurai no se, on which is a depth of 18 feet, lies near the south-east edge of a rocky bank, 1¼ miles long and a quarter to three quarters of a mile broad, having depths of 5 to 10 fathoms on it. At 3 cables southward of the rock the depth is 20 fathoms; and at half a mile from the depth of 5½ fathoms (on the northern edge of the bank) is a depth of 38 fathoms.

Clearing marks.—The north point of Biriyo sima in line with the north peak of Nosaki sima bearing E. ⅝ N., leads northward of Korai no se. South point of Hira sima in line with the north peak of Nosaki sima bearing E. by N. ¼ N., leads southward of Korai no se.

NAKADORI SIMA is 21¼ miles long between Sawo saki the south, and Tsua saki the north extreme.

The northern part of the island for a distance of 9 miles to the southward of Tsua saki is very narrow; high hills and mountains rising abruptly on both sides. The summit of Nakadori sima (O-mitzu yama) is a flat peak 1,446 feet high; Yabokura yama, 1,197 feet high, lies 2¾ miles to the northward of O-mitzu yama; thence to the northward the hills are much lower, the ridge over Tsua saki being only about 250 feet high.

Shimomu sima, 275 feet high, lying S.S.E. 1¾ miles from the north end of Nakadori sima, and one mile from the eastern shore, is nearly half a mile long north and south, and 400 yards broad.

Tanji, a remarkable conical shaped islet, 91 feet high, lying half a mile N.E. by N. from Shimomu sima, is steep-to except on its west side, from which rocks extend nearly one cable.

The north-east peak of Ojika, open one-third the breadth of the channel between Nosaki sima and Nakadori, bearing N.N.W. ½ W., will lead through the deepest water between Tanji and Shimomu sima.

Kamigashi, a rock 53 feet high and steep-to, lies 8½ cables off the east side of Nakadori sima, and a little over 3 miles to the southward of Shimomu sima, having off its north end a small rock 2 feet high.

Ikatchi, a rock 15 feet high, lies 2 cables from the western shore of Nakadori, about one mile north of O-mitzu yama. Vessels must not pass eastward of Ikatchi.

Tsubo gashi, a rock 10 feet high, with 12 to 20 fathoms round it at half a cable distance, lies W. by S. ¼ S. about one mile from Ikatchi, and 1½ miles to the northward of the entrance of Nama ura.

NAMA URA,[*] a bay situated immediately to the southward of O-mitzu yama, may be recognised by a conical rock 313 feet high, which forms the south entrance point; the bay is 2 miles deep and half a mile wide, with an even depth of about 16 fathoms. From the north-east side of the entrance, shelving rocks which dry at low water, extend 1½ cables in a south-westerly direction, shoal water continuing nearly 2 cables to the south-westward; Cone rock, the south-west entrance point, is steep-to, and has a depth of 16 fathoms at about three-quarters of a cable to the north-eastward of it.

Anchorage.—The best anchorage for large vessels is near the head of Nama ura, in 10 fathoms water, 2¾ cables distant from the shore, with the peak of O sima just open eastward of the Cone rock, bearing N. by W. ¼ W., and a patch of red cliff on the west shore of the bay, just north of Nama village, bearing W. by S. ¼ S.; and Joss point N.E. Small vessels can anchor to the eastward of this position, with Tsubo gashi (the 10 feet rock north of the entrance) in line with a black point on the east side of the bay bearing N. by W. ¼ W.; and the point on the south shore eastward of Nama village S.W. by W.

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[*] *See* Admiralty plan:—Nama ura, on chart No. 359; scale $m = 2 \cdot 0$ inches.

Oto no se, or Oldham rock, covered at high water springs, lies nearly 1½ miles E. by N. from Sawo saki, the south extreme of Nakadori sima. An islet 78 feet high, half a mile to the westward of Sawo saki in line with it, bearing W. ½ N., leads to the southward of the rock; and Tazaki (the north point of Kaba sima) in line with Sawo saki bearing W. by S. ½ S. leads to the northward of Oldham rock.

HIRA SIMA, nearly 2 miles from the east extreme of Nakadori sima, and 4 miles westward of Yenoi sima (*see* page 514), is 2¼ miles long and 1¼ miles broad, having near its centre a peak 663 feet high, sloping gradually to the coast on its north and west sides; to the southward of this peak there are remarkable ridges of cliffs, and over its north-east point is a prominent peak 325 feet high, rising perpendicularly from the sea on its eastern side.

The western side of Hira sima is steep-to, and trends in a north-westerly direction 2 miles from Ai saki the west point, to Kuro saki the north point of the island; the eastern side of Hira sima from Koro-no saki the south-west, to Tatsu saki the north-east extreme of the island, a distance of 2½ miles, is irregular, with a few off-lying dangers and islets.

Haidomari bay, on the north-east side of Hira sima, between Kuro saki and Tatsu saki, is 6 cables deep; it is, however, only suitable as an anchorage for junks.

Komoda bay, situated on the south-west side of the island, between Ai saki and Komo-no saki, affords protection to small vessels from north and easterly winds; but is exposed to winds from the southward and westward. The water is deep, and the strong tides and eddies tend to make it a not very snug anchorage. Near the centre of the bay is a small wooded islet, (Kojima), to the south-eastward of which vessels should anchor, the best berth being in 10 fathoms, with Ai saki bearing N.W. by W. ½ W. and the summit of Nanori rock S.S.W. ½ W. Eastward of Kojima, on the northern shore of the bay, is an inlet in which junks lie securely, for the purpose of loading coal (inferior) obtained from the mines.

From Komo-no saki rocky ledges extend in a south-westerly direction for 1¼ cables, and the shore to the eastward of this point for a distance of half a mile is foul, and should not be approached nearer than 3 cables.

Nanori, a remarkable rock 92 feet high, situated 6 cables to the south-westward of Komo-no saki, has rocky ledges surrounding it, those off its southern extreme extending nearly 2 cables. The north extreme of Nanori is foul, there being a depth of 3½ fathoms at 1½ cables to the northward of it; immediately outside the shelving rocks on either side, however, there is deep water.

In the centre of the channel between Nanori and Komo-no saki the depths are 12 to 20 fathoms; and the centre of Shimomu sima in line with Ai saki bearing N.N.W. ¼ W. will lead through in the deepest water.

Sakize, a cluster of conspicuous islets extending nearly half a mile from the eastern shore of Hira sima, should be passed at not less than 2 cables distant. About midway between Sakize and Tatsu saki, and nearly half a mile from the shore, is a rock that dries 3 feet at low water. Tatsu saki bearing N.N.W. leads to the eastward of this rock.

The channels on either side of Hira sima are navigable; that between Hira sima and Nakadori sima is clear of danger, but in the channel between Hira sima and Yenoi sima are the Saracen reefs situated to the southward of Yenoi sima, and the foul ground to the south-westward of Kuro sima, (a small islet 120 feet high). The eastern shore of Hira sima is the clearer side of this channel.

Directions.—Approaching Hira sima from the south-eastward keep Tatsu saki in line with the south end of Nosaki sima, bearing N.W. by N., which will lead nearly one mile westward of the Saracen reefs and half a mile from the foul ground south-westward of Kuro sima. (*See* page 514.) When the summits of Yenoi sima and Kuro sima are in line bearing N.E. by E. ½ E., alter course to the northward to pass between Hira sima and Iwo se (a rock 30 feet high, the westernmost of a group lying to the north-west of Yenoi sima).

Bound to Komoda bay from the eastward, keep about half a mile from the Hira sima coast, and enter the channel between Nanori rock and Komo-no saki, with Ai saki in line with the centre of Shimomu sima bearing N.N.W. ¼ W.; and when Kojima bears N.N.E., steer for the anchorage.

NAKADORI SETO, is the strait between the south-west shore of Nakadori sima and the eastern shore of Wakamatsu. Its northern entrance, about one mile wide, between the wooded islets of Kusi sima and Hino sima, is distinguished by a rock (on which is a conspicuous tree) lying off the north end of Wakamatsu. The channel takes an E. by S. direction for about 2½ miles, with an average breadth of 6 cables; it then trends to the southward, becomes very narrow and tortuous, with numerous islets and rocks in it.

The current runs very strong in the narrows; and the reef off the islets render the channel dangerous, if not impassable, for ships.

Kusi sima, lying off the west extreme of Nakadori, is 1¼ miles long N.N.E. and S.S.W., and nearly one mile across; it is fairly wooded and rises to a height of 627 feet. The shores of the island are rocky, and rocks above water lie off several points. Off the south-west point is a rocky islet 36 feet high, and sunken rocks extend one cable from its south point.

The passage between Kusi sima and Nakadori sima has only been examined as far as the north point of the former island, where the bottom is rocky, and there is a less depth than at its southern entrance.

Hino sima, one mile S.W. ¾ S. from Kusi sima, is 1¼ miles long north and south, and half a mile in breadth; wooded, and 797 feet in height. On the south side of the island is a small bay, in which there is a fishing village.

The coast of the island is rocky; a reef of sunken rocks extending one cable from the shore off the north point. A small wooded islet lies nearly a cable off the north-east point, outside which there is a rock with only 6 feet water on it at low-water spring tides. The south-east point shoals out for more than a cable; and off the south point, the water is shoal and the bottom uneven.

Yoshura sima, situated 2½ cables southward of Hino sima, is 6½ cables long, N.E. and S.W., 3 cables broad, partially wooded, and 266 feet high. Its western point is low, and from it a reef extends towards Arafuku: detached rocks, the outer of which is 14 feet high, lie 1½ cables to the southward of the islet.

Arafuku, an island nearly 1¼ miles long, N.W. and S.E., and nearly 1½ miles broad, is joined to the western point of Yoshura sima by a reef; and the water between it and Hino sima is shoal. The island is 769 feet high, wooded, and cultivated in parts; but its western side is bare of trees and covered with long grass, which when the sun is on it presents a reddish appearance, causing it to be conspicuous from a considerable distance, and thus a good mark for vessels wishing to pass through the Takigawara seto.

Off the north-east, north, and north-west points of the island, are several detached rocks extending about one cable off shore; off the north-east point, however, a rock which covers at high water, lies 1½ cables from it.

WAKAMATSU, an irregularly shaped island, nearly 6 miles long N.N.W. and S.S.E., lies between the Takigawara and Nakadori channels. The north-west coast of the island is much broken by an inlet, the entrance to which is between Hino sima and Nonahira (the north point of Wakamatsu), extending 2½ miles to the southward, with an average breadth of half a mile, and terminating in three branches, neither of which is sufficiently wide to anchor in. Just before reaching these branches anchorage may be had in 19 or 20 fathoms, sandy bottom.

Nonahira, the north point of Wakamatsu, is bold and rocky, and has some detached rocks extending one cable from it, the outer being above water. The west coast of Wakamatsu is bold and rocky, and tolerably straight and unbroken for 1½ miles; it then forms in two points with a bay between them.

Takigawara ura, the bay above mentioned, is half a mile deep, and about the same in width; with a sandy beach at the head fringed with trees. The bottom at the entrance is rocky, but even; the water gradually shoaling towards the beach, with sandy bottom.

The tide, which runs very strongly off Kanzaku hana (the northern point of the bay), is not felt in the upper part, where anchorage may be obtained.

Taka saki, the south extreme of the bay, may be passed close-to. A shoal, on which there is a depth of 11 fathoms, lies 4½ cables S.E. ¼ S. from the point, with deep water all round it, and rocky bottom.

Tanno kojima.—From Taki saki the coast trends to the eastward and is very broken and rocky. About a mile eastward of Taka saki, close to the coast, is Tanno kojima, a small rocky island half a mile in length.

DANGERS.—At 3 cables from the west side of Tanno kojima is a dangerous sunken rock, on which is a depth of only 1½ feet at low-water spring tides. Another dangerous rock with 3½ fathoms on it at low water lies 3 cables from the south point of the island, and S. E. by E. ¼ E. $1\frac{2}{10}$ miles from Taka saki.

The coast between Taka saki and Shiro saki should be approached with caution, as the bottom is rocky and uneven.

Shiro saki hana, the south point of Wakamatsu, is a rocky conical point at the southern entrance to the Nakadori seto.

Kuso, or Kadzura sima, three-quarters of a mile long, 7 cables broad, and 457 feet high, lies in the northern entrance to the Takigawara seto. The coast of the island is extremely rocky, except on its south side, where there is a sandy beach and a small village. The west point of the island terminates in a series of detached rocks with grassy summits, and at the north point are some sharp pinnacles. The island is principally covered with coarse grass, and is but partially wooded.

Aino sima, a small island, 244 feet high, lies in the northern entrance to the Takigawara seto, 3½ cables from Arafuku, and nearly cables from the north-east point of Naru sima; its shores are rocky.

Uno she, a small cluster of rocks, the highest of which is 18 feet above water, lies a little more than one cable north-east of Aino sima. A shoal of 12 fathoms, rocky bottom, lies 7 cables S.E. by E. ¼ E. from the south point of the same island.

Kibuta, a small island 131 feet high, lying in the Takigawara seto, may be passed close to; abreast it the channel is 6½ cables wide.

TAKIGAWARA SETO (the Naru channel of former charts), lies between the islands of Wakamatsu on the north, and Naru sima on the south. The strait is clear of dangers, and the shores on either hand may be approached within a distance of 2 cables; except the south-west coast of Wakamatsu, off which lie the two sunken rocks before described.

The narrowest part of the strait is abreast Kanzaku hana, where it is little over 4 cables wide.

When approaching the strait from the westward the island of Arafuku is, as before mentioned, a conspicuous landmark, and on nearing it and crossing the entrance to the channel, the small islet of Hebo will be seen bearing S.E. ¾ S.

On a point, about half a mile north-east of Taka saki (Wakamatsu), is a landslip, which is very conspicuous when seen from the south-east, and forms a good mark for the southern entrance to the strait.

The west extreme of Aino sima, or the extreme of Kanzaku hana, open of Taka saki, leads westward of both the sunken rocks off the south-west coast of Wakamatsu.

Tides.—The tidal streams at springs attain a velocity of 5 to 6 knots in the Takigawara seto, the greatest strength being felt abreast Kanzaku hana; at neaps the velocity is from 2 to 3 knots. The first of the flood makes along the north shore of Naru sima, and continues to run for about an hour after the tide has commenced to fall. Off Kibuta the tides meet, forming heavy tide-rips, which with the wind blowing fresh through the channel are dangerous to boats. The flood sets to the northward and westward, the ebb to the south and east. Among the islands north of the strait the tidal streams are scarcely perceptible.

NARU SIMA, on the south side of Takigawara seto, is of very irregular outline, the coast being indented by several deep inlets.

The north-west point of Naru sima (which forms the northern entrance point of Naru seto) has detached rocks above water extending one cable from it. Above the point is a hill 637 feet high, which when seen from the westward appears to have a peculiar knob on its summit, and is thus a good distinguishing mark for the entrance to the Naru seto.

The west coast of Naru sima is broken up into several small bays and indentations with sandy beaches at their heads, and rocky points between them. Numerous sunken rocks lie off nearly all the points; none, however, are believed to extend farther than 1½ cables from the shore.

Taki ura, the eastern of the two inlets on the north side of the island, 8½ cables wide at the entrance, extends in a southerly direction for about 2 miles. The small islet, Kojima, lies about half a mile inside the entrance, leaving a channel about half a mile wide between it and the western shore of the inlet. The islet is about 2½ cables in length; and shoal water extends 2½ cables S.S.E. from it, barring the passage eastward of it.

Ai-no ura, the western inlet, is narrower than Taki ura; it is 2¼ miles in length and from 2 to 5 cables wide, and is separated from Taki ura by a narrow strip of land which terminates in a rocky point (Kwanon saki).

Anchorage may be found at about three-quarters of a mile from the head of this inlet in 10 to 12 fathoms water, sandy bottom.

Kwanon saki, separating the entrances to the above inlets, has a rocky ledge extending from it in a north-west direction for a distance of 6 cables, and terminating in a cluster of rocks (No se), the highest of which is 80 feet above water.

Uno sima, a small island off the north coast of Naru sima, on the western side of the entrance to Ai-no ura, is surrounded by numerous sunken rocks extending a cable from it.

NARU SETO (Kuga channel of former charts), between Naru sima and Hisaka sima, is about 5 miles in length and three-quarters of a mile wide at its northern entrance, narrowing in about the middle of the strait to half a mile in width; its shores, formed of rugged rocky points with sandy beaches between, are steep-to, with no danger other than the rocks which skirt them close-to.

Kosima, a small island, 147 feet high, lies close off the coast of Hisaka sima, and shelters a small bay 1½ miles from the northern entrance.

Szudzu no ura, a bay on the shore of Naru sima opposite Kosima, is formed by a narrow curved point (Szudzu no hana) terminating in a steep cliffy nob, which projects from Naru sima; it is here that the strait is only half a mile across. A rock that dries 4 feet at low water lies three-quarters of a cable from the south shore of Szudzu no hana.

OKUSHI HARBOUR,* on the west coast of Naru sima, is situated about one mile inside the northern entrance to the Naru seto; it is a well protected harbour, the entrance to which is half a mile wide narrowing to 3 cables at the anchorage. A small village is situated on the beach at the head of the harbour, but the inhabitants are poor, and no supplies can be depended on. The best anchorage is in from 10 to 11 fathoms, sandy bottom, in the middle of the harbour.

HARDY HARBOUR,* a bight about 8 cables long in a northerly direction, is situated on the south-west side of this island, in the Naru seto (Kuga channel); it has shoal depths of 2 to 5 fathoms extending from its north-west entrance point, and terminating in a knoll of 12 feet water near the middle of the entrance; between this knoll and Observatory island (south-east side of entrance) the channel is only one cable wide, but there is a depth of 15 fathoms in mid-channel.

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* *See* Admiralty plans :—Okushi and Hardy harbours, on chart No. 359; scale *m* = 4 inches.

At one cable south of Observatory island a shoal with 9 feet water on it, extends 1¼ cables from the shore, having near the outer edge a depth of 13 fathoms.

Mia sima, 280 feet high, situated south of Hardy harbour at the southern entrance to the Naru seto, is formed by a high mass of land at its north end connected by a narrow neck of stones with a smaller piece of rocky ground, 280 feet high, which is again joined by rocks to another similar, but still smaller islet, 150 feet high. Rocks and foul ground extend 1½ cables from its north-west and southern shores.

Naru kami seto, between this island and Naru sima, is less than 2 cables wide, but has deep water in it. Vessels should however, not use it, except in an emergency.

Tobinoko, an islet lying close off the coast of Hisaka sima, and 8½ cables S.S.W. ½ W. from Szudzu no hana, if kept open of the point three-quarters of a mile south of it, leads to the eastward of Keary rock, and may be useful when it is too hazy or thick to see the more distant clearing mark.

Keary rock, a dangerous rock only 20 feet in diameter, and having a depth of only 3 feet on it at low water spring tides, lies in the fairway of the southern entrance to the Naru seto, one mile south-east of Hisaka sima. The north extremes of Kaba sima and Tsubura sima in line, lead southward of the rock.

CAUTION.—The tides set with considerable velocity near this danger, and great caution is necessary when navigating in its vicinity. The ebb tide sets right on to Keary rock.

Gunn rock, on which there is only a depth of 3 feet at low water, lies three-quarters of a mile S.S.W. from the southernmost point of Naru sima.

The north-east extreme of Hisaka sima in line with Szuyechi (an islet 72 feet high, close to the south end of Mia sima), bearing N.W. by N. leads to the westward of the rock.

An islet off the north point of Kochi Domori ura in line with the east extreme of Shinto ga sima (an islet 146 feet high, near the south-east shore of Naru sima) bearing N.N.E. ¼ E. leads eastward of the rock.

Tides.—The strength of the tidal streams in the Naru seto is very great, both flood and ebb stream attaining a rate of 6 knots at spring tides Heavy tide-rips are met with in the strait, and are especially noticeable at the northern entrance where they occur suddenly, and are dangerous to boats; they alter in position and magnitude according to the time and state of the tide.

HISAKA SIMA (Kuga sima of former charts) is an island of nearly oval form, 5 miles long, and 3½ miles wide, hilly, and rocky along its shores. The northern shore of the island is indented; a long inlet extending 2½ miles in a south-south-east direction, nearly dividing the island into two parts. The entrance to this inlet is very exposed, and its western entrance point (also the western entrance point to the Naru seto) is partially wooded, and rocky, with several detached rocks above water lying off it, one of which is a pinnacle.

Off the west point of the entrance to the inlet is a sunken rock at three-quarters of a cable from the shore.

Hisaka no minato, the inlet above-mentioned, has a narrow winding entrance, in some places only one cable wide, extending for a distance of 1$\frac{2}{10}$ miles; it is, however, clear of danger, and there is no difficulty in passing through it in a handy steamer. On emerging from this narrow passage a perfectly landlocked basin, nearly circular in form and 7 cables in diameter is reached, the shores of which rise from a fringe of muddy beach (seen at low water) in grassy slopes to hills from 700 to 900 feet high; immediately inside the entrance to this basin is a small rocky, wooded, islet, which may be passed close-to on either side.

At the south end of the basin are two shelving muddy points a little more than one cable apart, with a depth of 7 and 8 fathoms between them forming the entrance to an inner and smaller basin, 3 cables across. From here the inlet branches for a short distance in two directions (S.E. and S.W.), the water gradually shoaling, and both drying for some distance out at low water.

Perfect security may be had in Hisaka no minato, and repairs and beaching could be effected with safety in any weather. The narrowness of the entrance, however, in a great measure detracts from the value of the harbour, which otherwise would be a perfect typhoon anchorage.

Anchorage.—Anchorage may be taken up anywhere in the outer basin in from 8 to 10 fathoms, mud bottom; and perfect shelter may be obtained in the inner basin in 5 to 6 fathoms.

Gengio no hana, the west extreme of Hisaka sima, has a dangerous reef 3 feet above water, lying 2½ cables to the northward of it.

The west coast of Hisaka sima is tolerably straight and unbroken; it rises steeply from a rocky shore to a range of hills, 800 to 1,100 feet in height.

Supplies.—The island affords little ground for cultivation; the inhabitants are extremely poor, and no supplies can be obtained.

FUKAI SIMA, the principal island of the Goto group is about 18 miles long from Ose saki its south-west point, to Haiya saki the north-east point; and is 15 miles across from south-east to north-west.

The island is very hilly, and its shores are broken by numerous inlets and bays; on its north-west, south-east, and east coast are promontories of some extent rising from rocky shores to grass covered hills of volcanic formation, with fertile valleys between them and the more rugged hills of the interior. The north-east coast forms, with the south-west shore of Hisaka sima, the Tanno ura seto, and rises somewhat abruptly to wooded hills from 600 to 800 feet high. Two inlets indent the coast of Fukai sima on its north-east side.

The north-west part of Fukai sima forms a projecting promontory sloping gradually on all sides from Sho yama, a hill 594 feet in height. The promontory is fertile and well cultivated, rising at its southern end to several ranges of hills which take a general north-east and south-west direction, radiating in a measure from the highest and most prominent peak on the island, Tetega yama, 1,520 feet high. The shores of the promontory are rocky and shelving, and should, therefore, not be approached too closely.

Kashi no ura, the southern of the above-mentioned inlets, has a small islet 70 feet high in the middle of the entrance; the channel into the harbour, 1½ cables wide, being on its west side.

Anchorage.—After passing through this channel anchorage may be obtained in 11 fathoms, mud bottom, with the east extreme of the islet in line with the S.E. point of Hisaka sima; and the north entrance point of the harbour in line with the west extreme of Hisaka sima.

The tidal streams set round the harbour at the rate of 1½ knots an hour during spring tides.

Tógi no ura, the northern inlet, has a sandbank extending some distance across it from its southern shore; which renders it unfit as an anchorage, except for very small vessels.

The north point of Fukai sima, at the entrance to the Tanno ura seto, is bold and rocky, rising to a double-topped partially wooded hill 620 feet high. Heavy tide-rips occur off this point.

Kamo no sima, a cluster of rocky islets and rocks, extending for half a mile in a north-west and south-east direction, lie about half a mile from the shore of Fukai sima. The highest rock is 86 feet; the northern rock of the group is situated three-quarters of a mile N.W. from the north point of Fukai sima, and about 2½ cables from the main cluster; it is 4 feet high, and forms the only danger when entering the Tanno ura seto.

The passage between the Kamo no sima rocks and the main is clear, and is about 3 cables wide at its narrowest part.

The coast as far as Kuro saki forms a small double bay, extremely rocky, with off-lying rocks extending in some places as far as two cables from it.

Kuro saki, a bold rocky point rising to a wooded hill 828 feet high, forms the eastern entrance point to Kisiku no minato.

West of Kuro saki the island is richly cultivated and well watered by two rivers, which rising some distance inland flow one on either side of a gentle slope into the southern parts of two inlets. The shores are shelving and rocky, the reefs off Hi saki drying from 1½ to 2 cables out, and shoal water extending further off.

Kisiku no minato, the eastern of the two inlets, is only large enough for very small vessels ; its entrance is clear and safe if the eastern shore be kept close-to. There is a village inside, opposite the entrance, where good water may be obtained and supplies of poultry and fish in moderate quantities.

Sonza ura, the other inlet, is a little larger than Kisiku no minato, and anchorage for a vessel of moderate size may be had in 9 to 10 fathoms, mud bottom.

Reef.—Two small rocks, which uncover 3 feet at low water, lie $1\frac{6}{10}$ miles westward of the entrance to Sonza ura, and 3 cables from the shore ; they bear N.E., and are distant 3 cables from the east point of Sho ura.

SHO URA, on the east side of the north-west promontory of Fukai sima, is three-quarters of a mile in depth, and half a mile wide, the water shoaling gradually to the head of the bay, which terminates in a fine sandy beach.

Anchorage.—Good shelter from all winds except those between north and east may be had in Sho ura. The most convenient anchorage is in from 6 to 7 fathoms, midway between the shores, abreast the village on the west side, and a little more than half a mile from the head of the bay : the holding ground is good.

Hime sima, a small island lying N.N.E. from the north-west point of Fukai sima, is 5 cables in length and 4 in breadth, wooded, and partially cultivated, except on its north-west side which is cliffy and precipitous. The island is 647 feet high, and forms a conspicuous landmark from the north-westward.

Otona se, is a small rock 5 feet above water, lying midway between Hime sima and Fukai sima.

Kamisone, two rocky knolls, the nearest of which lies 2½ miles N. by W. ¼ W. from the west extreme of Hime sima, has a depth of 3½ fathoms on it at low-water spring tides. The outer knoll, 2½ cables N.W. by N. from the former, has a depth of 2⅓ fathoms on it at low water.

Shinsone, northward of the Kamisone rocks, and 3¼ miles N. ¾ W. from the west extreme of Hime sima, is a rocky patch on which is a depth of 4 fathoms at low water.

Nechisone, a patch of rock, over which there is a depth of 7 fathoms, lies 3¾ miles N.W. from the west extreme of Hime sima, and about 2 miles W. by S. from the Kamisone rocks. The locality is often marked by tide-rips.

Ose saki (the south-west point of Fukai sima) in line with the west extreme of Saga sima bearing S. ⅛ W. clears all the above dangers, leading to the westward of them. The point north of Sho ura, well open of the east extreme of Hime sima, leads to the eastward of all the rocks.

Tides.—The flood stream sets to the north-west and the ebb to the south-east in this locality, with a velocity at spring tides of one to 2 knots an hour. At neap tides the ebb stream does not make until sometimes as much as 4 hours after high water, and the flood stream 4 hours after low water; this interval diminishes as spring tides come on, when the flood and ebb streams appear to make at from 1½ to 2 hours after low and high water.

SAGA SIMA, an island about 2 miles long (north and south), and from three-quarters to one-quarter of a mile wide, lies nearly 2 miles to the westward of the above-mentioned promontory of Fukai sima; its shores are steep and cliffy on all sides except the eastern, where there is a small bay, off which anchorage may be obtained in 9 fathoms (sandy bottom) sheltered from westerly winds. Saga sima is partially cultivated, and in some parts covered with coarse tufted grass and bamboo. Its highest summit, of which there are two, is 512 feet above the sea, and the island when viewed from the westward, at some distance, appears as two islands.

TAMA NO URA*, a large inlet or arm of the sea indenting the west coast of Fukai sima, is finely situated as a port of refuge, and but for the great depth of water in it, would be a magnificent harbour.

The only entrance for ships (6½ cables in width) is 4½ miles north of Ose saki and 2½ miles S.E. from Saga sima; and care must be taken not to mistake the blind entrance (available only for boats) at 2¼ miles north of Ose saki, as this passage has a reef of rocks extending right across it.

Sima yama, separated from the main island (Fukai) by the blind entrance to Tama no ura 1½ cables wide, is steep and wooded, rising to a ridge of hills 861 feet high. Its western shore is very steep and rocky, the highest hill along it being 530 feet.

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* *See* Admiralty plan:—Tama no ura, on chart No. 359; scale, $m = 1{\cdot}5$ inches.

Off the north point of Sima yama, which is also the south point of entrance to Tama no ura, is a small rocky islet and rocks, together extending 1½ cables from the shore.

Algerine bluff, the outer point on the north side of the entrance to Tama no ura is 1¼ miles from Warr point, its inner point; both these lie under the high land of the northern of three high peaks of Fukai sima.

The main inlet of the harbour, which has a varying breadth of 3 to 7 cables, follows the general contour of the sea coast for 6 miles, separated from the sea by Sima yama, and a neck of high land extending northward from Ose saki. It first trends S. by W. for 3½ miles, then curves to the south-east for 1½ miles to its head, from which an arm branches one mile to the north-east. The depth within the entrance is 32 to 38 fathoms, decreasing gradually to 16 fathoms at the head of the main arm, rendering anchorage inconvenient; and this deep water is the only drawback to this otherwise beautiful harbour, which is split up into numerous small bays, creeks, and inlets. Directly south-east of the entrance, and on its eastern shore, the harbour branches into three narrow arms each about a mile in length. The two southern branches are so narrow, and the water so deep, as to render them unavailable as anchorages. The northern branch, although of a more convenient depth, is also narrow and tortuous, and exposed to westerly winds, which blow in here at times with considerable force.

There are several small villages at the heads of the several creeks. The chief village, Tama no ura, is situated on the bold sides of Yebe so hana; the population is composed chiefly of fishermen. There is a good road to Fukai town.

Anchorages.—Anchorage, sheltered from northerly and easterly winds, may be found on a sandy spit of shoaler depths projecting from the north shore of the harbour just within the entrance. To pick this anchorage up, the vessel should be steered about 2 cables from the shore, keeping a few houses, seen on the opposite shore of the harbour, open of a low rocky point. The anchor should be let go immediately a conical hill on the south side of the harbour is seen open of the east end of Kojima (Hallowes island) in from 9 to 10 fathoms, at about 2 cables from the shore. With N.W. winds however this anchorage is exposed to a heavy swell, and the holding ground (sand and shells) is not good. Heavy, shifting, squalls off the land, causing the vessel to yaw, are experienced at this anchorage during N.W. winds.

Still following the main inlet, rounding numerous points, and passing several small bays, the best anchorage for large ships is found at the head of the inlet after it turns to the south-east, where the water shoals regularly and gradually. The best position is in 10 to 11 fathoms (sand and mud bottom), about 2½ to 3 cables from shore.

Nagasu no ura, the continuation of the main inlet, which branches to the north-east, is 1½ cables wide at its entrance, between a low rocky point and the small islet Ko sima. The channel is, however, narrowed to one cable by Ko sima rock.

Ko sima rock lies 80 yards from the south-east point of Ko sima, and uncovers at low water.

The rocky point forming the east entrance point to this branch may be passed within a distance of half a cable, and by doing so the rock will be cleared.

Very safe and sheltered anchorage may be obtained in this part of the harbour for ships of moderate size, in from 6 to 7 fathoms, mud bottom. The water shoals gradually to the head of this branch of the harbour, and the lead will indicate the best position for anchoring in mid channel.

Imogi no ura, the branch of the harbour which takes a south-west direction under the hills of Ose saki is of convenient depth, but narrow.

Kojima (Hallowes island), a small, round, wooded islet, situated one mile within the entrance to Tama no ura, is 224 feet high, with deep water close around.

Yebe so sone, a rock awash at low water, lies near the entrance of Imogi no ura, about three-quarters of a cable S.E. from Yebe so hana. It may be cleared by keeping the summit of Kojima (Hallowes island) open of all the points on the west side of the harbour, until Yebe so hana is in line with the blind entrance.

Benten sima, a small islet off the north entrance point of the south-east branch of the main inlet, is joined to the shore by a rocky reef. The coast immediately east of the islet forms a small bight, the ground in which is foul.

Supplies.—Fish, eggs, fowls, and some vegetables may be procured at Tama no ura village, as also good water.

Tides.—It is high water, full and change, at Tama no ura village at 8 h. 31 m.; springs rise 9 to 12 feet; neaps 1½ to 4½ feet. The tidal streams are not much felt in the main arm of the harbour, but at the entrance of Nagasu, Imogi, and Tatsu ura, and also through the blind entrance, they run with some velocity.

OSE SAKI (cape Goto), the south-west point of Fukai sima, is very bold, having a depth of 42 fathoms within 1½ cables distance; and its steep rocky shores receding from the cape at nearly a right angle. A small rock above water, and a sunken rock close outside it, lie half a cable from the foot

At spring tides the tidal streams set strong round the cape, the flood to the eastward and northward; and ebb to the southward and westward.

Tide race.—Very heavy overfalls are frequently experienced off Ose saki, even in calm weather, and they are extremely dangerous for a small vessel to pass through.

LIGHT.—From a white circular lighthouse, 36 feet high, situated on Ose saki, and at an elevation of 265 feet above high water, is exhibited a white light, *revolving every half minute*, visible from seaward, between the bearings of N.W. by W. and S. ½ E. (through north and east), which should be seen in clear weather from a distance of 22 miles.

DAIHO MURA.—The coast of Fukai eastward of Ose saki is steep and rocky, and trending to the E.S.E. forms a slight indentation for 3¼ miles; thence it curves to the northward, forming a bay nearly a mile wide and half a mile deep, on the sandy beach at the head of which is the small village of Daiho.

Anchorage, sheltered from northerly winds between N.E. and West, may be obtained in this bay, in 8 to 10 fathoms; bottom sand and shell.

Birro sima, a small islet 221 feet high, separated from Fukai sima by a channel 1½ cables wide, lies south of Daiho mura. A small rocky islet having deep water close south of it, lies 1½ cables S.S.W. from Birro sima.

Directions.—Entering Daiho ura from the eastward, after passing Tsutara sima steer W.N.W. for Birro sima, taking care not to bring it south of that bearing until within 3 or 4 cables from it, when haul up for the centre of the bay and anchor with the small islet on Toma se (the reef eastward of the bay) in line with the second high hill of Tsutara sima; and the west extreme of Birro sima just touching the south point of the bay.

Toma se, a reef of sunken rocks and rocky patches which uncover at low water, extends three-quarters of a mile in a S.S.W. direction from the south coast of Fukai sima, on the east side of Daiho bay. Towards its outer edge is a small islet 26 feet high, but there are two rocks, one of which uncovers at low water, lying seaward of the islet.

Futago, a small rocky islet 156 feet high, with some sunken rocks lying close around it, is situated three-quarters of a mile east of Toma se and 7 cables from the shore.

Tsutara sima, a narrow island three-quarters of a mile in length (east and west) and 364 feet high, has at 2½ cables off its east point another islet 88 feet high. Between this islet and Kujira se (6½ cables from Tsutara sima) there is foul ground. The south shore of Tsutara sima is also foul for a distance of 1½ cables.

The large bay of which Daiho forms the western and Kuroshi the eastern end, is 4 miles long, the hills round it rising steeply to a height of 500 and 700 feet, backed by a range 1,200 feet in height more inland. The hills are partially cultivated and wooded, but the slopes are principally covered with grass.

KUROSHI, at the eastern end of the large bay on the south side of Fukai sima, affords excellent shelter from northerly and easterly winds. When standing in from the southward the coast should be passed at not less than from 3 to 4 cables, as it is shoal and rocky for some distance. The water shoals gradually off Kuroshi, and anchorage may be taken up as most convenient.

TSUBASHI HANA.—The south-east part of Fukai sima forms a promontory similar in description to, but smaller in extent than, that at the north-west point of the island; it rises gently from the sea to a height of 192 feet and is fairly cultivated. The shores of the promontory are extremely shelving and rocky, and should not be approached too closely. The south-east point of the promontory (Tsubashi hana) has off it, 1¼ miles to the north-east, the small islet, Bahan, in the neighbourhood of which foul ground extends nearly half a mile from the shore.

The COAST.—From Tsubashi hana the coast of Fukai sima trends to the north-east for 1½ miles, thence curving gradually round to the north-west to Nagasaki hana, the south-west point of Tawo bay. The coast is very low, rocky, and shelving, with shoal water extending off it, in some places to a distance of half a mile.

Kuro sima, situated in the entrance to Tawo bay, is three-quarters of a mile long east and west, and half a mile across; its southern face being precipitous and rocky. Its north and west sides are rocky with small patches of sandy beach between, and the island which rises to a height of 349 feet, is partially cultivated. With the exception of a small rocky islet lying one cable from its northern shore there are no off-lying dangers.

TOMIE MINATO (TAWO BAY), between Nagasaki hana and Kuro hana, is about 2 miles wide at its entrance, and about the same distance in depth; but shoal water extending from its south shore contracts the anchorage considerably.

The south-west portion of the bay contains several low islets and rocks, and is shoal. At Tomie village, situated in this part of the bay, supplies of fowls, fish, and vegetables may be procured.

The head of the bay consists of rocky points rising rapidly to high ranges of hills at the back, with small sandy beaches between the points.

Nagasaki hana, the south-west point of the bay, dries out for nearly extreme of this foul ground (4½ fathoms) lies 1¾ miles north-west from the east extreme of Kuro sima.

O Shirashi, a small rocky islet 32 feet high, lies in the middle of Tawo bay.

Ko Shirashi, another smaller islet, lies 1¼ cables S.S.W. from the former, and from being of a very whitish appearance is often a conspicuous object when entering the bay. There is deep water close around these islets, but a shoal patch of 3¾ fathoms lies 1½ cables N. by W. from the northern islet.

Anchorage.—Very good anchorage may be obtained in Tomie minato sheltered from all winds, except those from the eastward between E.N.E. and S.E. by E. It is said that no very heavy sea ever sets into this bay.

Directions.—When entering Tomie minato (Tawo bay) the southern shore should be avoided. The island of Kuro may be passed within a few cables on either side. When entering from the southward and westward, the east extreme of Kuro sima in line with the extreme of Saki yama hana bearing N.E.¼E. leads one mile clear of all dangers off Tsubashi hana; continuing this course until the west point of Kuro sima bears N. ½ E., alter course to N.N.W. to pass one-quarter of a mile westward of Kuro sima, and when the highest part of O sima (an island 301 feet high, south-east from Tawo bay) is in line with the north point of Kuro sima bearing S.E. ½ E., haul up to N.W. ½ W. Ko Shirashi (the white rock before mentioned) will then be nearly ahead, and passing close southward of it do not haul to the south-west until midway between the rocks and the shore, when anchorage may be taken up in 6 or 7 fathoms, sandy bottom. Moderate sized vessels may stand in to the south-west until the islet south of O sima just begins to show clear of the south end of Kuro sima; anchoring in from 5 to 6 fathoms water.

Mutsu, two small rocky islets, 40 and 17 feet high respectively, lie off the northern channel into Tawo bay; they have deep water close around them and bear E. by N. ¾ N. 2 miles from the north-east extreme of Kuro sima, and 4 miles E. by S. ½ S. of Ko Shirashi (White rock).

A group of islands extending for 3½ miles in a north-east and south-west direction, lies 5 miles S.E. by E. from Tomie minato.

O sima, the southern and highest island of the group, is also the largest, rising over its east shore to a height of 301 feet; its southern shores are cliffy and rocky while the northern coast is more sloping and fairly cultivated. At its north-east end is a fishing village and small camber for boats. There is deep water close off its southern extreme.

Birro sima, a small islet 212 feet high, lies 2½ cables south-west from O sima, with a second and smaller islet, 42 feet high, off its western extreme; it is steep-to on its south-side, with a projecting rocky ledge extending for three-quarters of a cable from its western end, outside which is deep water.

Itabe, a small island about one mile north of O sima, is flat, being only 24 feet above the sea; its shores are rocky. In the eastern entrance to the channel between O sima and Itabe, is a depth of 3¾ fathoms, and as the islands are flat and low it is advisable to avoid using it.

Aka sima, another island of the group, 172 feet in height, lies about half a mile E.N.E. from Itabe; reefs extend from its north, north-east, and south-east sides. A small flat island 30 feet high lies between Itabe and Aka sima.

Hana se, the reef north of Aka sima, lies nearly half a mile from the island.

The bottom in the neighbourhood of this group of islands consists of rocky and sandy patches. Close to the islands the tidal streams set with considerable velocity, the flood to the northward, ebb to the southward. At a few miles from the islands the tidal streams are weaker.

Tatai sima, a conical rock 191 feet high, lies N. ½ W. 2¾ miles from the east extreme of Aka sima, and S.E. ¼ E. from Sakai yama hana; leaving a navigable channel of 1½ miles between it and the former; and one mile between it and the land immediately south of the latter. Tatai sima is the most southern of a group of rocky islets and reefs which extend from it nearly half a mile in a N.N.W. direction and 1¼ miles to the eastward; it may be passed close-to on its south side. Kuro hana (the north entrance point of Tomie minato) open of Tatai sima, leads to the southward; and the summit of Tatara sima in line with the east extreme of Sada sima (to the northward) bearing N.N.W. ¼ W. leads to the eastward of these dangers.

Sakai yama hana, the eastern point of Fukai sima, is a rounded point of land with a rocky coast rising to a cluster of grassy, sloped, conical hills, 470 feet high, immediately above the coast; a small valley separating them from other hills of the same description, the highest of which are 1,026 and 1,028 feet high. These latter slope down on their north-west sides to a fine, well cultivated, and fertile valley, which extends across from Tawo bay to the town of Fukai, the whole forming the eastern promontory of the island.

North of Saki yama hana the coast is rocky; a small bay lies immediately north of the point, northward of which the coast forms an indentation 5 miles long and about 1½ miles deep, in the centre of which is the town of Fukai.

Fukai, the chief town of the Goto islands, and formerly the fortress the fortress and the massive stone walls of which bound the streets. The town and inhabitants present a thriving and cleanly appearance; behind it are fertile and well cultivated hills and valleys.

A junk harbour is formed by a camber which extends for a distance of 1½ cables in a south-east direction from the north end of the town; at its extreme is a small Japanese lighthouse.

Immediately south of the main portion of the town there are reefs with large boulders on them, which dry 3 feet at low-water spring tides.

Supplies of fowls, fish and vegetables may be procured. A small steamer runs about once a fortnight between Nagasaki, Fukai, the Korea, and north Goto's.

Anchorage.—The most convenient position for anchoring off Fukai is with the summit of Sada sima bearing E. ½ N., and the east extreme of Yaneo (an island 2 miles north-west of Sada sima) in line with the summit of Tatara sima bearing N.N.E., in 8 to 9 fathoms water, at 4½ cables from the camber lighthouse, and 3½ cables from the outer edge of the reef south of the town.

Sada sima, an island 1¼ miles long and 6 cables across, lies 2¼ miles E. by N. from the town of Fukai, and 2½ miles north of Saki yama hana. Its summit, 467 feet in height, is fringed with trees thinly planted. Off its south point is a pinnacle rock above water, with a rock awash between it and the island, the whole extending one cable from it; with these exceptions the shores of Sada sima are free of dangers.

Hocho and Takinoko, two rocky and grass covered islands joined by a reef of rocks, lie 3 cables from the mainland of Fukai; Hocho is 190 feet high.

Yaneo, an island 462 feet high, lies 3 cables north-east from Hocho and Takinoko; it is a little more than half a mile long and there is deep water between it and the above-mentioned rocky islands.

Tatara sima, 525 feet high, lies half a mile north-east of Yaneo, and about the same distance eastward of Haiya saki (the south point of the eastern entrance to the Tanno ura seto). Two sunken rocks lie to the north and west of the north point of Tatara sima.

Rocks.—A cluster of 3 rocks, having at low-water springs less than 6 feet water on them, lie half a mile N.N.E. ½ E. from the north point of Tatara sima. The other danger lies 5½ cables W. by N. from the same point and 7 cables from the south coast of Hisaka sima; it has a depth of only 9 feet on it at low-water spring tides.

KABA SIMA, an irregular shaped island about 3 miles in length, lies 2½ miles south-east of Naru sima; it is 1,061 feet in height.

Tsubura, is a small island about one mile in extent, lying about half a mile north-west of the southern part of Kaba sima.

Shinoki, 295 feet high, is a small island situated half a mile south of Tsubura.

Futago, two small rocky islets, lie nearly a mile south of Tsubura, and half a mile west of the south-west point of Kaba sima.

Outer island, 155 feet high, lies about a mile south of Futago.

TANNO URA SETO (Fukuye channel of former charts), between the north-east shore of Fukai sima and the south-west coast of Hisaka sima, is about 4 miles in length, and has an average width of 1½ miles. Its shores may be approached within a distance of 2 cables; and it is clear of dangers, with the exception of the rocks lying off Tatara sima at its eastern entrance.

Tides.—The tidal streams run very strongly through all the passages between the Goto islands; in the vicinity of Tatara sima they were found to attain a velocity of 6½ knots an hour at half tide, the average strength between the north-east point of Fukai sima and Tatara sima being 5 knots an hour; but in the narrowest part of the channel attained a rate of fully 7 knots an hour. The flood tide sets to the northward through the strait (Tanno ura seto), a great rush of water setting between the islands of Yaneo, Hocho, and Takinoko, and round Haiya saki.*

At half flood the strongest current sets along the coast of Hisaka sima; heavy tide-rips occur off the north end of the channel, especially on the flood during north-west winds.

CAUTION.—Passing through the Tanno ura seto from the north-westward with the tide (ebb), care must be taken to keep well over towards the Fukai shore, at the south end of the channel, as there is a strong tendency to sweep the ship to the northward of Tatara sima, which passage is dangerous. Vessels should always pass between Haiya saki and Tatara. The winds in the channels between the Goto islands can never be depended on.

The duration of the tidal streams in the north part of Goto islands is nearly equal, the main direction of the flood being to the northward, and the ebb to the southward.

A portion of the flood stream on the east side of the islands passes through the channels south and north of Nosaki sima. On the west side the flood stream runs in a north-easterly direction, and on nearing the islands in the vicinity of Ojika it splits into two parts; that to the eastward flowing towards the centre of the channel between Ojika and Nosaki sima, is met by the stream from the south-eastward through the channel south of Nosaki sima, thence these streams run together to the northward, and when in Ojika seto are joined by the stream flowing to the north-westward through the channel on the north side of Nosaki sima. The whole body of the stream then flows to the westward passing through the narrow channel between Tera sima and Uku sima, where its velocity at times is very great.

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* On one occasion when coming through the channel against a flood tide, H.M.S., *Sylvia*, was turned six points off her course, on meeting the strength of the tidal stream

A portion of the stream on the west side of the islands sets towards the western entrance to Ojika seto, where it is met by a small portion of the eastern stream, causing heavy tide-rips and overfalls.

The ebb splits on the west side of Uku sima, one part running to the south-westward past the islands off the west side of Ojika; the other to the south-eastward through the narrow channel between Uku sima and Tera sima and thence towards the north end of Nosaki sima, where it divides and runs in the directions of the channels on either side of that island. On the west side of Nosaki sima it again splits, one part running to the south-eastward through the channel on the south side of Nosaki sima; the other to the south-westward along the west side of Nakadori sima, uniting with the stream flowing in the same direction on the west side of Ojika.

In the vicinity of Hira sima the streams run through the channels at the rate of 3 to 5 knots during springs, causing heavy overfalls.

TORI SIMA or PALLAS ROCKS, three in number, lie S. W. ½ W. (westerly) 33 miles from Ose saki lighthouse; the southern and largest of the group is 60 feet high. The two southern rocks are close together; the south rock about one-third of a cable in length, when seen from the southward having the appearance of a pyramid, but when viewed from the northward it presents the form of a sharp ridge with somewhat steep sides; under favourable circumstances this rock is accessible on its north side. The third and smallest rock (North rock), 40 feet high, lies 4 cables N. N. E. from the South rock. Depths of not less than 37 fathoms are found at a distance of from one to 7 cables from the rocks, the bottom generally consisting of coarse sand, coral, and shells. The flood stream (at neaps) has been observed to set weakly to the north-west, with a light easterly wind The Pallas rocks are steep-to, and fishing vessels by hooking on to their lee side ride out moderate breezes.*

ME SIMA GROUP (Meac sima of former charts), consisting of two principal and three smaller islands, with numerous islets and rocky pinnacles between them, lie between S. W. ¼ W. and S. W. ¾ S., 19 miles from the Pallas rocks; the whole extending in a north-east and south-west direction for about 6 miles. The islands are entirely uncultivated, and are inhabited only by about 120 fishermen who visit them during the fishing season (May till November), and occupy two small villages; a few only remaining during the other months of the year. During the fishing season large quantities of fish (cod, rock-cod, tai, &c.) are caught, dried, and salted, and shipped off to Osaka. With the exception of fish no supplies can be obtained.

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* Mr. Edmonds, Commander of P. and O. SS. *Orissa,* reports tha on several occasions when passing these rocks the currents were found to be with the wind.

O SIMA (Taka sima of former charts), the northern island of the Me sima group, is nearly 2 miles long north-east and south-west, and 1¼ miles wide. It has no conspicuous peak, but rises to a height of 752 feet in a nearly flat ridge, covered with short scrubby trees and bushes, its bold rocky shores rising steeply for 250 feet from the water. Off each point of the island lie detached rocks; none, however, more than 3½ cables from the shore.

Maruta, a rocky patch, lying 2½ cables from the north-east point of O sima, is about one cable in extent, and consists of a sunken rock, and one awash at low water, and another which dries 4 feet at low water. Between the point and the rocks are depths of from 11 to 19 fathoms, and junks use the passage; but heavy tide-rips occur outside and among the rocks, and as the tide sets strong round the islands, a wide berth should be given to the Maruta patch.

Two small rocky islets lie off the north-west point of O sima. The outer islet, 100 yards in length and 33 feet high, lies 2 cables from the point, and has a sunken rock close to its west side. The inner islet, 6 feet high, has a sunken rock close off its east side.

The south-west coast of O sima is bold and rocky, with no hidden dangers off it, but a sunken rock lies close off the south-west point; it has deep water close off it. The south coast is steep and rocky, and forms a bay 6 cables across and about 3 cables deep, at the head of which, on a beach of boulders, stands a fishing village.

Anchorage.—Fair shelter may be obtained in this bay, with winds from N.E. to N.W., in from 19 to 20 fathoms, the bottom being of hard coarse sand.

The south-east point of O sima is rocky, and has several rocks above water, extending 1½ cables from it. There are no hidden dangers.

Kuromi sima, a small island, 2¾ cables long and 2½ cables wide, is separated from the south-west point of O sima by a channel about 2 cables across, through which the tidal streams set strongly, forming heavy tide-rips. In the channel are two rocks, one of which dries 2 feet at low water; and off the south end of Kuromi sima are numerous rocky pinnacles above water.

URI SIMA (the Asses Ears of old charts) 1¾ cables south-west from Kuromi sima, is 5 cables long and 4 cables wide, rising in two rugged and sharp peaks 570 and 607 feet high respectively, the peculiar form of which gave rise to the name given them by early navigators. The channel between Uri sima and Kuromi sima is studded with rocky pinnacles, and several islets and rocky pinnacles extend nearly 3 cables from its south-east point.

Finger rock, the most southern of these, is a remarkable pinnacle 40 feet in height: a sunken rock lies about one cable west of Finger rock.

Hanaguri sima, 3½ cables long and 2½ cables wide, rises in rugged declivities to a height of 481 feet. In the channel, 1½ cables wide, between it and Me sima, are several rocks.

ME SIMA, the highest island (931 feet) of the Me sima group, is nearly 1½ miles long and half a mile broad; its summit rising in a remarkably sharp peak, wooded on its western, but bare and precipitous on its eastern side.

The west coast of the island forms a slight indentation with a small sandy beach off which at a distance of 3 cables, no bottom was obtained at a depth of 50 fathoms. A smooth round rock lies close inshore. The north-west point of the island is bold with no offlying dangers, but the south-west coast is rocky; rocks above water lying off it. The south point of Me sima rises to a peak 309 feet high, and is almost separated from the rest of the island by a cleft in the rock.

Nijiu.—Two rocky islets lie 2½ cables from the south point of Me sima, and a rock awash lies 2 cables N.W. from the islets, and the same distance from the point.

The south coast of Me sima forms a bay 2 cables wide, and the same in depth, the shores of which are rocky. There is here a temporary fishing village, and a pool of fresh water, but it is only possible to land in fine weather.*

The east coast curves inwards forming an indentation, with a rocky islet about one-third along it. Immediately south of this islet is a small village.

Same no se, the southern rock of the Me sima group, 18 feet high, lies 1$\frac{1}{10}$ miles S. by E. from the rocky islets off the south point of Me sima. There is deep water all round it, and the passage between it and the islets is quite clear.

Tides.—Strong tidal streams set through the channels between the islands, the flood to the north-west, and the ebb to the south-east; but the general direction of the tidal streams is more to the northward and southward.

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* Commander B. Bax, R.N., H.M.S. *Dwarf*, 1874.

Hatake sone, a bank with depths of 30 to 40 fathoms on it, is said by the fishermen to exist about 2 miles to the north-east of the Me sima group; it has not been examined.

KOSHIKI ISLANDS.*—This group, consisting of two large islands with numerous smaller islands and islets, lies about 70 miles E.S.E. from the Mé sima group, and 12 miles from the mainland of Kiusiu; extending in a N.E. and S.W. direction for a distance of 20 miles. The islands are very hilly, and the highest peak (Oda yama) on the northern coast of the southern island attains an altitude of 2,036 feet. The southern and western coasts of the islands are steep-to, there being a depth of 300 fathoms at a little over 2 miles from the shore; but the north-east coast is much less so, and in this direction several rocky islets extend one-third of the distance across to the mainland.

The inhabitants of the Koshiki islands are poor and ill-clad, and are principally engaged in fishing and agriculture. Rice, sweet potatoes, wheat, and a small quantity of cotton and sugar are grown; and dried and salted fish are sent to the mainland in some quantities.

SHIMO NO KOSHIKI, the largest and southern island of the group, is about 12 miles long, and 4 miles wide at its broadest part. The northern part of the island tapers off to a narrow, rocky, and hilly promontory, which, when viewed from east or west, appears to be islets.

Teuchi ura, a bay on the south coast of Shimo Koshiki, about half-a-mile wide and one mile deep, affords shelter from all winds except those from the southward, in 8 fathoms in about the centre of the bay, round the shores of which extends a large village containing (in 1879) 1,270 inhabitants. The head of the bay is a sandy beach, through which a stream enters the sea, and there is a camber for boats lying nearly in line with the beach.

Entering Teuchi ura, the points on either side should not be approached closely as rocks extend off them; the reef from the western entrance point narrowing the entrance to less than 5 cables. Rocks extend 2 cables from Terakonsu daki, the eastern point.

Hai saki, the western point of Shimo no Koshiki is steep and rocky, rising abruptly to a wooded peak 778 feet high. Southward toward Teuchi ura the coast is composed of cliffs, the hills over which, covered with brushwood, rise to a height of over 1,000 feet.

Pillar rock.—Three miles northward of Hai saki, and close to the shore, is a remarkable rock, with precipitous sides 351 feet in height, having the appearance of a solid pillar. When viewed from the northward or southward it is very conspicuous, but when seen from the westward its peculiarities are hidden by the higher land behind it.

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* *See* Admiralty chart:—Western coasts of Kiusiu and Nipon No. 358; scale m = 0·13 of an inch.

The description of this group is by Commander P. Aldrich, R.N., H.M.S. *Sylvia*, 1879.

Hato saki, 4 miles northward of Hai saki, is steep and bold, rising in a wooded slope to a peak 1500 feet high, at about 1¼ miles inland.

The COAST between Hai saki and Hato saki is steep, hills of from 1,100 to 1,400 feet in height rising immediately over it. From Hato saki the coast trends to the north-east for 4 miles (with two detached groups of rocky islets lying off it) and is generally steep, rising rapidly to Oda yama, a peak 2,036 feet high. Thence the shore trends to the northward, and the hills over it are not much more than 500 feet in height.

Tsubura daki, the north-west point of the island is cliffy, rising abruptly to two sharp peaks about 530 feet high. A rock awash lies nearly 2 cables west of this point.

The east coast of Shimo no Koshiki southward from Tsubura daki, is rocky and steep for a distance of 5 miles to Oda yama hana. Southward the coast forms in two open bays, in the northern of which is the village of Naga ama.

Gareshigoro hana, the point separating the two bays, is rounded and rocky, with a few trees on it; it is 295 feet high.

On the sandy beach in the southern bay is the village of Hito daki, near which is a fine waterfall.

Sheibi daki, the southern point of the south bay, 902 feet high, terminates in a pinnacle, which is seen only from the northward. The north side of the hill over it is wooded, rising in a series of sharp peaked hills to the summit 1,600 feet high. Northward of this point the hills are nearly bare of wood, and boulders crop up above the surface to their summits.

The coast southward to Teuchi ura is steep, rising precipitously to sharp peaked hills 1,000 to 1,200 feet high, covered with bush and scrub, and streaked with bare rock on their slopes.

IMITA NO SETO, the narrow channel separating Shimo Koshiki from Taira jima, (the next island northward) is navigable with due precautions; but the current runs strong and overfalls form on either side, according to the state of the tide. There are no hidden dangers except close to the shore, but the passage is narrowed at one part to less than 2 cables by reefs which project opposite each other, one on either shore. The southern rock of the Taira jima reef is 11 feet above water, and forms a good leading mark, as it may be passed close to.

The reef extending from Shimo no Koshiki is all above water. The south point of Taira jima should be given a good berth and a ship should not haul to the northward round it, until the 11 foot rock above mentioned is well open of the point of the island next north-west of it.

Tides.—The tidal streams set through the strait with a velocity of from 2 to 3 knots, or more, at springs, the flood setting to the N.W., and ebb to S.E.; and the stream turning from 1½ to 2 hours after high and low water.

TAIRA JIMA, an island about 3 miles long and 1½ miles across, connected to the north island (Naka Koshiki) by a reef, forms in two or three hills of over 900 feet in height. It is entirely devoid of trees, but is covered in places with coarse grass and brushwood from base to summit. Some parts are cultivated, and there is a village on the east side.

Reef.—Off the S.E. point of Taira jima, extending nearly 5 cables, is a reef of rocks nearly all above water, amongst which is a small but conspicuous islet 175 feet high, with trees on its summit.

KAMI NO (NAKA) KOSHIKI the northern and most important island of the group is of irregular formation, the S.W. coast being broken up by inlets and bays; the south coast steep and cliffy; and on the north-east shore is a sandy beach enclosing a long narrow lagoon. The island is hilly, and the west coast rises abruptly to a ridge nearly 1,000 feet high. Obai yashi yama, on the south-east part is 1,402 feet high. From the north-east point of the island there extends in an E.N.E. direction for a distance of 4 miles, a group of detached rocky islets with several sunken rocks among them, through the channels between which, the tides set with considerable rapidity, causing tide-rips and overfalls. The ebb tide sets to the south-east; and it is dangerous to approach this part of the island closely, while the ebb stream is running.

NISHI NO URA, a deep bay, the sandy shore of which forms nearly the whole of the north shore of Naka Koshiki island, affords shelter from all but North and N.W. winds, in which direction it is open. It is clear of dangers, and the water shoals gradually to the shingly beach at the head of the bay, on which stands the village of Sato, containing (in 1879) 3,768 inhabitants.

Sato ura.—Sato mura is situated on a sandy peninsula; and Sato ura a small bay on the east side of the island, affords no anchorage.

Kaiyamuta saki, the south point of Naka Koshiki, is a cliff, having sunken rocks extending one cable from it.

TATSU MARU, a deep inlet on the south-west side of the island, affords secure and sheltered anchorage. The eastern entrance point is a rocky spit connecting the island with the small islet Daimio jin, and with Taira ura. Northward of Daimio jin is a remarkable ridge of square-topped pillar-shaped rocks, the highest of which is 60 feet above the sea. From these rocks the inlet takes a northerly direction for 1½ miles with an average breadth of from 4 to 5 cables, and then branches into two narrow arms three-quarters and one mile in length respectively.

Anchorage.—Large vessels should anchor at about half a mile inside the western entrance point immediately north of a wooded point, the termination of a long sandy beach on the eastern shore. Vessels of moderate size may anchor in 16 fathoms abreast the opening leading to the eastern narrow arm. Small vessels may anchor in from 9 to 10 fathoms abreast the village, on the west side of the northern arm. The eastern arm is too narrow to afford anchorage, but at its head a vessel could be beached in perfect safety.

Tides.—It is high water, full and change, at Tatsu maru at 7h. 40m.; springs rise 7½ feet, neaps rise 3 to 5 feet.

NAKA KOSHIKI URA.[*]—Passing the south point of Naka Koshiki from the eastward the coast forms a double bight, in the eastern of which (formerly known as Argus bay), there is good anchorage, well sheltered from northerly winds. A village stands on the sandy beach at the head of this bay.

Kamita hana, a rounded point separating the above bay from the more western one, is very rocky; and a reef which dries at low water extends 2¾ cables from it.

Passing this point Naka Koshiki ura opens, extending three-quarters of a mile in a north-east direction. At the head of the bay is the chief village of the Koshiki group, the seat of the local government, containing (in 1879) 1,120 inhabitants.

Anchorage.—Good anchorage may be obtained in Naka Koshiki ura in from 7 to 8 fathoms (sandy bottom) 4½ cables from the village. Care should be taken to anchor midway between the shores as they are rocky, and in some places shelving.

Supplies.—Fish, fowls, eggs, &c. may be obtained in small quantities.

Kami se, a reef of rocks, extends nearly 3 cables off the north-west point of Kami no Koshiki. Tide rips form frequently off it, and the tidal streams run strongly in its vicinity.

KURO KAMI, a remarkable pinnacle rock 72 feet in height, lies 3 miles E. ½ N. from the north-east point of Naka (Kami no) Koshiki. Between it and the point are several islets and rocks, the passages between which should not be attempted.

Channel between KOSHIKI ISLANDS and COAST of KIUSIU.—This channel, between Kuro Kami and Kamo sima (a small rock 20 feet high lying one mile from the Kiusiu coast), is 9 miles broad, and in fine weather is perfectly safe. In thick weather, however, the Naka no se reef is dangerous, and vessels should then not attempt to pass westward of it, but should keep to the eastward, to ensure which she should not stand into over 30 fathoms. Westward of Naka no se, between that danger and Naka Koshiki, there are depths of from 30 to 45 fathoms, while east of the reef the depths are everywhere less than 30 fathoms.

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[*] *See* Plan of Naka Koshiki ura (Argus bay) on chart No. 626 shortly to be published.

Currents.—During August and September a constant southerly set was experienced* in mid-channel between the Koshiki islands and the coast of Kiusiu, which near the shore on either side, when accelerated by the south-going tide, set with a velocity of 2½ miles an hour; but not so strongly in mid-channel.

South of Hashima saki the flood stream sets to the S.E., and ebb to the N.W. The flood tide splits on the south point of the Koshiki islands branching N.W. and N.E., the latter being deflected to the east by the east coast of the islands, and curving round to S.E. The change of stream occurs from 1½ to 2 hours after high and low water.

Naka no se (Pioneer rocks), discovered by H.M.S. *Pioneer*, in 1861, when passing inside the Koshiki islands, are two dangerous rocks, the highest 8 feet above high water, lying about 2½ miles south-west of Kuro kami islet, and in the fairway channel between the Koshiki islands and the mainland. They may be passed at 3 cables on all sides.

TAKA SIMA (Symplegades).—A group consisting of five small islets, the whole being contained within a space 2 cables longeast and west, and 1½ cables wide, lies S. by E. ¼ E., 11½ miles from Na saki, the south-west point of the Koshiki islands.

When seen from either northward or southward they appear as three; and the south-west and highest, 210 feet high, assumes a triangular shape; the south-east islet, 189 feet high, has a round summit, and the centre islet has the form of a pillar. The north-east islet has two pinnacles, which are prominent when bearing either N.W. or S.E.

When bearing East, only two of the islets are visible. The south-east point of the group is perforated; and the channels which separate the islets can only be used by boats.

Rocks.—Two small rocks lie south of Taka sima. The eastern is 2 feet above high water, and lies S. ¾ E. nearly 4¼ cables from the summit of Taka sima; the western rock, 4 feet high, is situated S. ¾ W. distant 2 cables from the same summit. A shoal, on which is a depth of 15 feet, lies S.E. ¾ E. one cable from the western rock. These rocks have deep water around and between them, but being only a few feet above water their locality should be avoided at night.

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* Commander P. Aldrich, H.M.S. *Sylvia*.

Soundings.—Depths of from 13 to 30 fathoms are obtained near the coast of Taka sima; 140 fathoms at a distance of one mile W.N.W.; 80 fathoms at the same distance N.E.; and 71 fathoms 7 cables to the southward.

Tides.—It is high water, full and change (approximately), at Taka sima at 7 h.; springs rise about 9 feet; the ebb stream runs strongly to the south-eastward.

TSUKARA SE (RETRIBUTION ROCKS*) lying S. ⅛ W. 8¼ miles from Taka sima summit, consist of four isolated rocks, divided into two groups by a channel nearly one cable wide. When bearing North or South they appear as two pinnacles; and when bearing East and West only three of the rocks are visible.

The southern rock is 96 feet high; and from it the northern pinnacle 90 feet high, bears N.N.E. ¼ E. distant 1⅓ cables.

Soundings.—There is a depth of 11 fathoms close to the north extreme of Retribution rocks; 23 and 32 fathoms near the east side; 15 on the south; and 19 near the west side; with 14 fathoms in the centre of the channel betwen the two rocks.

UDSI SIMA (ROCHE PONCIÉ† ISLANDS) a group of islands lying 15 miles S.W. from Tsukara se, extends over an area of 5 miles north and south, by 3½ miles wide; and consists of four islands having navigable channels between them.

The principal island, from which the group takes its name, is 1¾ miles long, with a conspicuous conical summit, 1,097 feet high, rising over the north point. From the north-west point several pinnacle rocks extend 1¾ cables, amongst which stands the Haycock, 330 feet high; a conical islet, 190 feet high, lies near the south-east point, and a small rock lies close to the south-west point.

Rocks.—Two small rocks lie off the south extreme of Udsi sima. The inner covers at high water, and is situated E. by S. ⅛ S. one mile from the south-west point of that island.

The outer rock, 2 feet above high water, lies S.S.E. ½ E. three-quarters of a mile from the south-west point of Udsi sima.

East island, the eastern of the Udsi sima group, lies three-quarters of a mile eastward of Udsi sima, the channel between them being narrowed to about half a mile by off-lying dangerous rocks on each side, with deep water near and between them. The summit of East island, 344 feet high, is over the north point, and there are several hills of nearly the same height southward of the summit.

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* Discovered by H.M.S. *Retribution* in 1858.

† Named after the Ingénieur-hydrographé of the French expedition under Admiral Cecille in 1846.

An islet, 132 feet high, lies a short distance north of East island, and a quarter of a mile from the east side are two rocks 12 feet above water; the eastern shore of East island is cliffy and fringed with off-lying rocks. In the channel between Udsi sima and East island fishing boats find shelter among the numerous rocks; the fishermen inhabiting temporary houses on shore.

Double island, distant 8 cables West of the south-west point of Udsi sima, are both 227 feet high; a rock awash at high water, lies N. $\frac{3}{4}$ E. 2 cables from their west extreme. The channel between them appears open only when bearing north or south.

Sami sima (Chimney rock) 185 feet high, and 2 cables long north and south, is situated S. by W. $\frac{3}{4}$ W. $2\frac{4}{10}$ miles from the south extreme of Udsi sima; a small islet lies close to its north extreme.

Directions.—Deep water is found close to and between the various islands of the Udsi sima group, and by day nearly all dangers are visible.

At night, vessels should not approach within a mile of the north side of the islands. If passing on the south side, between Chimney rock and the group, vessels should not pass within one mile of the latter.

THE WEST COAST OF KIUSIU.

The COAST* of the province of Kiusiu westward of Sata no misaki (see page 245), forming the eastern shore of the entrance to Kagosima gulf, trends to the north-north-east, gradually curving to the north and east for a distance of 5 miles to Tatsume no hana, the whole being rocky without any anchorage off it.

TATSUME NO HANA, is a bold and rocky point backed by a mass of undulating hills more or less cultivated and wooded, which at 2 miles from the point attain an elevation of 1,058 feet. Northward of Tatsume no hana the coast trends to the north-east; and at $1\frac{3}{4}$ miles from the point is a small bay bounded on the north by a rocky and green clad point having a fringe of trees alongs its summit. Southward is a beach of boulders and shingle, and a steep shore covered with bushes almost to the waters edge.

Anchorage may be obtained in the above bay, in from 12 to 13 fathoms water, affording for a vessel of moderate size, protection from winds between East and South. When anchoring bring the south point to bear about S.W. by W. $\frac{3}{4}$ W.

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* *See* Admiralty chart: The western coasts of Kiusiu and Nipon, including the Korea strait, No. 358; scale $m = 0\cdot13$ inches.

Sata iras, a small inlet with a sandy beach at its head, on which is situated a fishing village, lies immediately round the north point of the above mentioned bay; there is, however, no room inside for a ship to swing.

Shelter.—At 1½ miles northward of Sata iras, is a rocky wooded point, just beyond which is another indentation, affording fair shelter from southerly and easterly winds in from 9 to 10 fathoms sandy bottom. On the boulder beach is the small village of Okawa. This is the best anchorage in this locality.

Tides.—The flood stream sets at from 1½ to 2 knots an hour to the northward of Sata iras. At the other two anchorages the stream is not so much felt.

KAGOSIMA GULF* is an arm of the sea 35 miles in length and from 5 to 10 in breadth, which runs in a northerly direction into the southern part of Kiusiu.

Kami se, a rock, awash at low water, with depths of from 5 to 10 fathoms round it at 2 cables distance, lies in the mid-entrance of Kagosima gulf, 2 miles S.E. ½ S. from Nagasaki hana on the northern shore, and 4 miles N.N.W. from Tatsume no hana on the south-eastern shore of the gulf; from it, the east head of Chiri sima is seen just open of the north and low wooded point, Oo saki (Yama gawa), bearing N.N.E. ⅛ E. This last serves as a leading mark if Chiri sima be kept well open.

Sakura sima.—At 25 miles within its entrance the large island of Sakura, 3,636 feet high, and from 4 to 5 miles across in every direction, nearly fills the head of the gulf, with channels on both sides leading into an inner gulf, or spacious harbour, 6 miles by 9, and quite landlocked. The shores of the island are lined with villages, and several islets and rocks lie from three-quarters to 2 miles off its north-east side. The eastern of the above-mentioned channels is very narrow at the south-east point of Sakura, and has depths of from 40 to 48 fathoms in it.

The western channel, between Sakura and the city of Kagosima, on the mainland of Kiusiu opposite, is about 6 miles in length, narrowing from 3½ miles in width at its southern, to 1½ miles at its northern end. The water in this channel is also deep, varying from 12 to 30 fathoms in the southern entrance (in the neighbourhood of Parker shoal) to 80 and 85 fathoms at its northern end.

Kami she or Parker shoal, lying in the southern part of the western channel dries at low water, is nearly circular and about 4 cables in extent; on its south-west side is a flat of from 3 to 5 fathoms where temporary anchorage may be obtained. A fort stood on this shoal in 1863.

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* *See* Admiralty plan :—Kagosima town and anchorage, No. 372; scale m = 1·25 inches.

Okiko and Karasu islands, lie close off the south-west and west part of Sakura; the latter has small spits off its north and south points; otherwise both are steep-to within a distance of one cable.

Kagosima city.—On the western shore facing the island of Sakura stands the city of Kagosima, formerly the fortress of the Daimio, Prince of Satsuma. Battery point, to the south of the city, is low, and has a spit extending from and around it to 2 cables, very steep at its edge; a shoal also fills the bay north of this point. Off the centre of Kagosima in front of the Daimio's castle is an inner harbour or large camber, gained by entrances between five forts of masonry, which have deep water close up to them; this castle cannot be seen from the gulf. There is a cannon shot foundry here, worked by Japanese, and the town is in telegraphic communication with Nagasaki.

Two small rivers disembogue, one on the north side of the city with long spits off its points of entrance, on one of which H.M.S. *Racehorse* grounded during the attack on Kagosima in 1863; the other (the Kotsuki gawa) flowing through the southern part of the city, falls into the shallow bay just north of Battery point. North of the city the hills reach the sea.

LIGHT.—From a white staff 40 feet in height, situated on the northern extremity of the breakwater fronting Ben-ten fort, at an elevation of 45 feet above the sea, is exhibited a fixed *red* light, which should be seen in clear weather from a distance of 6 miles.

Anchorage.—The western shore of Sakura island is very bold, but anchorage in from 12 to 25 fathoms may be found E. ½ N. of the castle of Kagosima, very close in, a good berth for a small vessel being in 12 fathoms, with the light bearing N.W. distant 1¼ cables.* In an easterly gale there is danger of driving off the bank into very deep water and having to slip the cables.

Anchorage also may be obtained generally in the southern part of the channel in from 21 to 24 fathoms, but at its northern part it deepens to 80 fathoms.

The extreme depth of the water in the gulf renders anchorage anywhere very difficult. Indifferent anchorage has been found close to the beach on the western shore, near the Seven rocks 4 or 5 miles south of Kagosima.

Shoal water extends from one to 2 miles from Seven rocks and appears to trend with the shore.

The bottom is very uneven off Yama gawa, a ledge of from 3 to 6 fathoms steep at its edge, extending a mile from the shore. The lead shows black volcanic sand, white sand, and clay, with seldom two casts alike. The remainder of the western shore to the southward has been partially examined; some banks and steep ledges were found which render the whole shore generally unsafe for anchorage.

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* Lieut. J. W. Brown, H.M.S. *Hornet,* 1879.

Hamaichi.—There is no good anchorage on the eastern side of the gulf northward of that mentioned as being 1½ miles north of Sata iras, but at the head of the gulf on the small bank off Hamaichi, and north of Ko sima (Havock islands), there is anchorage in from 7 to 9 fathoms.

YAMA GAWA,* a small harbour, on the west side of entrance of Kagosima gulf, is the crater of an extinct volcano: it affords excellent shelter from winds from the southward, and the holding ground (mud and sand) appears very good. The town, consisting of between 200 and 300 inhabitants, is situated on the low land about the spit. Its north part opens east to the sea by a funnel-shaped passage a quarter of a mile in length, but only 1½ cables wide at its inner part, formed between an extensive shoal bank which extends one mile from the shore, south of the entrance, and a reef (Shigino she) which extends 3½ cables southward from the northern shore inside Oo saki. There are 3¾ to 4½ fathoms over the lip of the crater or bar with one patch of 2 fathoms in the centre. No vessel should attempt to enter in bad weather, although a vessel of 1,000 tons may lie there at anchor or moored to the shore. Inside the harbour the water is deep. The land round the harbour presents no distinguishable feature, it being of moderate height, wooded, and from the southward not easy to make out in consequence of its being backed by the higher land about Thalia bluff.

Supplies of fish, fowls, and fruit may be procured. There is a spring of hot water on the sandy beach.

Tides.—It is high water, full and change, at Yama gawa, at 7h. 32m.; springs rise 9½ feet, neaps 3 feet.

Kaitzubo no she, a shoal bank of sand terminating in a spit to the southward (inside of which is deep water), extends 7½ cables from the shore southward of the entrance to Yama Gawa. Its southern end is nearly 5 cables E. by N. of Mata hisomi, an arched rock, situated 2 miles south of the entrance to the harbour.

Directions.—Entering Kagosima gulf from the south-west, bound for Yama Gawa, the high land about Thalia bluff should be opened out clear of Oo saki before hauling up to the northward of Matahisomi (arched rock); the bluff will then appear like an island, and the left extreme of the high land in its vicinity kept in line with Oo saki (the next point to it) bearing N. by W. will lead clear of all shoals on the port hand. Stand on until within half a mile of Oo saki, when haul to the westward, taking care not to shut in the east extreme of Chiri sima behind Oo saki, until a Japanese stone lantern, situated on a mound near the end of the spit, is seen, when bring it to bear West, which will take a vessel clear of the sunken rocks (Shigino she) on the starboard hand, and the shoal on the port hand. On nearing the spit alter course as requisite round it into the harbour.

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* *See* Admiralty plan:—Yama gawa harbour, on sheet No. 372; scale $m = 1 \cdot 26$ inches.

Thalia bluff, is a conspicuous headland which rises to a well defined peak named Okaki yama. Between it and Oo saki the land is low and well cultivated, and hence when seen from the east side of Kagosima gulf, Thalia bluff, with the high land immediately west of it, appears like an island. In the bay south of it is the village of Minato.

Tsiring (Chiri) sima, a wedge-shaped island, on the western shore of the gulf, nearly one mile from the shore (to which it is connected by a reef on which the sea sometimes breaks) is from 150 to 200 feet high; it is lower than Thalia bluff (Okaki yama), rising gradually from the westward to the eastward, and terminating in that direction in a steep bluff. On the eastern shore, opposite, a shoal bank (Racehorse shoal) extends about 2¼ miles from the shore. Between this shoal and Tsiring sima the gulf is only about 3 miles wide.

Kasa she, or Waters rock.—Two dangerous sunken rocks, on the outer of which is 2½ feet water, and on the inner 9 feet, lie close together, E. ½ N., 7 cables from Oo saki, the northern point of the entrance to Yama gawa harbour. Between the rocks and the shore is a depth of 6 fathoms.

OKAIMON DAKI (Mt. Horner of former charts), an extinct volcano nearly a perfect cone in form, the sides of which, covered with trees and brushwood, rise at an angle of about 30° from the waters edge to the summit, 3,020 feet above the sea, is a very conspicuous landmark; and is of great assistance to vessels making Van Diemen strait from the westward. Its rounded, steep, southern termination (Waki saki), forming the north point of entrance into Kagosima gulf, is steep-to, a depth of 100 fathoms being found at only one mile from its rocky shore; whereas eastward and westward of it, that depth is not found nearer than 5 miles from the shore.

The COAST from Waki saki (Okaimon daki), trends to the northward for about 2 miles, and thence to the north-westward, forming a sandy beach 4½ miles long, as far as Akaeshe hana. Thence the coast trends to the westward for 6 miles to Shemmi hana, and is for the most part fringed with a sandy beach, broken here and there by low rocky patches, and the mouths of small rivers. Inland the country rises at an easy gradient, and is fertile and well cultivated to a considerable distance, dotted with detached hills.

MAKURA.—Westward of Shemmi hana is a bay about 2 miles wide between its outer points, on the sandy beach at the head of which stands the town of Makura, containing in 1879 a population of 4,580; the town was at one time fortified, and the ruins of a fort built on a rocky reef close along the beach are still visible. Makura is in postal communication with Kagosima.

Anchorage, sheltered from northerly and north-westerly winds, may be had in the bay, off the town of Makura. The depths decrease regularly, with sandy bottom, but the west side of the bay should be avoided, as it shoals some distance from the shore.

Tatte se, a remarkable pinnacle rock 145 feet high, lies 2 cables from the shore, off the western point of Makura bay.

ME SAKI, $3\frac{1}{4}$ miles west of Tatte se, is a cliffy point with several hills behind it of from 400 to 500 feet high. One cable from the point are two sunken rocks, but outside them the water deepens rapidly and the point may be approached to within a distance of half a mile. Tide-rips are often met with to the westward of Me saki.

Tides.—Between Me saki and the entrance to Kagosima gulf the flood stream sets to the northward, and the ebb to the eastward; neither stream being very strong within 2 miles of the shore. The tide-rips met with off Me saki are caused by the west going stream meeting the stream (flood) flowing northward towards Noma no hana.

Discoloured water.—At one or two miles off-shore, patches of discoloured water, having the appearance of shoals, will often be met with between Me saki and Okaimon daki. These patches are caused by the soil washed down by the rains remaining for a considerable time in suspension in the river water.

Directions.—Working to the westward, sailing ships might often find it advantageous to work along the shore between Okaimon daki and Me saki, where the water is smooth and the influence of the Kuro siwo (Japan stream) is not felt. Immediately west of Okaimon daki they should stand in to 12 or 14 fathoms, not less; and as they get westward and sight the remarkable pinnacle rock Tatte se, they should go about when it and Me saki come in line. Passing through the Koshiki channel (between the Koshiki islands and the mainland) from the southward, on a dark night, or in thick weather, allowance must be made for the westerly set which occurs on the ebb stream south of Dashima saki. Soundings should be frequently obtained, and vessels should haul to the eastward if in 30 fathoms until a lesser depth is found.*

Bonotsu ura, a small bay immediately north of Me saki, is exposed and affords no safe anchorage. Its north point (forming the south point of Tomari ura) rises to a hill 435 feet high, covered with scrub; and when viewed from seaward has somewhat the appearance of an island.

TOMARI URA, 1½ miles north of Me saki, and 9½ miles south of Noma no hana, on the west coast of the province of Satsuma, is a sheltered harbour protected from all winds except those from West and S.W.; and from these quarters the sea is broken by a cluster of detached rocks which stretch from the north entrance point, in a south-easterly direction, and form, to a certain extent, a natural breakwater, leaving but a very small arc open to the south-west. At the head of the harbour is a sandy beach on which is situated a village containing (in 1879) 920 inhabitants. A small stream flows into the harbour northward of the village. Gold is found in small quantities in a district about 5 miles inland.

The entrance to the harbour is easily distinguished by the peculiar ridge of detached rocks above-mentioned, the most southern of which (O she) is about half a cable long and 96 feet high, having midway between it and the shore, another rock 128 feet high. The coast in the neighbourhood of Tomari is rocky, and there are numerous detached rocks off nearly all the prominent points outside the harbour, extending from one to 2½ cables from them. Most of these are above water, but off the north point of entrance to the harbour are two sunken rocks outside the visible dangers; and when passing, this point should be given a wide berth.

O she rock may be rounded close to: between it and a small rock (which dries one foot) situated half a cable off the south entrance point, the entrance to Tomari ura is 4 cables wide.

The situation and capabilities of Tomari ura render it an important harbour, especially as one of refuge to vessels experiencing signs of a typhoon in the neighbourhood of Van Diemen strait. Indeed it is the only secure harbour on the coast for 120 miles north-east from Sata no misaki. In the event of deciding to bear up for it when the weather showed unmistakeable signs of a coming typhoon, it would be necessary to be sure of making it before thick weather came on.

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* H.M.S. *Sylvia*, on a dark night, when passing through the Koshiki channel steered a direct course (N. by E. ½ E.) from Noma no hana for Kamo sima, and from the soundings obtained must have been set 3 miles to the westward in as many hours; passing one mile east of Naka no se (Pioneer rocks), and meeting a southerly current of 2 knots when entering the narrow part of the channel.—Commander P. Aldrich, R.N., 1879.

Directions.—After passing between O she and the rock off the south entrance point, the rocky islet, Matu sima, 43 feet high, will be seen on the south side of the harbour; and the course may be altered to the eastward to pass it at any convenient distance outside one cable.

Anchorage. — Large ships should anchor in 11 fathoms, with O she open about three times its own breadth northward of Matu sima. Vessels of moderate size will find better shelter by anchoring more to the southward in from 9 to 10 fathoms, with the summit of Matu sima in line with O she.

Supplies of fish, fowls, &c. may be procured in small quantities.

Tides.—It is high water, full and change, at Tomari ura at 7h. 10m.; springs rise 8 feet; neaps rise 3 to 5 feet.

Kushi ura, a bay immediately north of Tomari ura, is 2 miles wide at its entrance and about the same in depth. Being very open and exposed it is, however, of little use as an anchorage; its shores are rocky.

TSURUHA SAKI, the north point of Kushi ura, 5 miles N. by W. ¾ W., from Me saki, rises as an almost perpendicular cliff from a base of detached rocks extending 2½ cables from it. The cape is partially wooded and cultivated; Sura take, a hill 816 feet high, lying 1½ miles inland from it. A small rocky islet, not distinguishable when bearing eastward of N.E. by N., lies close off the point.

She wan she, a small and dangerous rock with less than 6 feet water over it at low water, lies 2 miles N.W. by W from Tsuruha saki, and 4$\frac{1}{10}$ miles S. by E. ½ E. from Noma no hana; right in the fairway of vessels passing along the coast between Me saki and Noma no hana. The sea breaks heavily on this danger in bad weather, and with a smooth sea its position is generally indicated by a tide-race; but at times there is nothing to show its locality.

Beroe jima, 8 cables long and 3½ cables wide, covered with grass and stumps of dead trees, lies about three-quarters of a mile southward of a conspicuous landslip which is situated on the mainland about 3½ miles southward of Noma no hana. The island is about 1¾ miles northward of Tsuruha saki and half a mile from the shore; and when seen from the south-west shows in three conical summits at its north end, fringed in places with long stemmed trees, which except at the top, are bare of leaves.

The COAST, from Tsuruha saki to Noma no hana, trends N.N.W. for a distance of 6 miles, forming a long bight rocky at the waters edge, and rising to hills partially wooded and cultivated 1,100 to 1,200 feet high.

Noma no take, a very prominent peak 1,964 feet high, is a conspicuous feature from seaward when off this coast; the summit as seen from the northward or southward, presents something of the appearance of a hood, but from the westward it stands out in bold relief as a sharp peak with a perpendicular cliff to seaward.

NOMA NO HANA, 6 miles N.N.W. ½ W. from Tsuruha saki, the most western part of Kiusiu, is cliffy to seaward, and surrounded by detached rocks, most of which are above water. Two small rocks above water lie 3 cables from the southern termination of the point. The land rises at a moderately steep slope from the point, then dips again, and rises steeply to the summit of Noma no take.

Kome jima and Hirase, a group of small islets and rocks, lies nearly three-quarters of a mile northward of Noma no hana, and there are sunken rocks between the group and the shore.

The coast trends eastward from Noma no hana, forming rocky points, with bays between, for 3½ miles, as far as Kata ura.

KATA URA, a small harbour completely sheltered from all winds, lies 3½ miles eastward of Noma no hana. The entrance, open to the northward, is protected by two small islands, which are so situated outside as to prevent any heavy sea setting into it. The squalls are, however, violent, especially with westerly winds, which sweep down over the high hills on that side of the harbour. Inside the bay is the village of Kata, containing about 1,500 inhabitants. Ko ura, a village containing 1,680 inhabitants, is situated at the head of Kata ura, only the west extreme being visible from the anchorage.

Kan no sima, the north-eastern islet off the entrance to Kata ura, is about 1½ cables in length, and 178 feet high, the summit being thinly wooded. Numerous small rocks lie close around it, and the channel between it and the shore is foul, as is also the north-east and east of the islet to a distance of half a mile.

Tattebai sima, the other small islet off the entrance, is about the same size as Kan no sima, its western side being cliffy; and when viewed from seaward the island presents a conical appearance with an uneven summit, 241 feet above the sea. The islet is steep-to all round, except on its south side, where it is joined to the mainland by a shoal spit. From the northward Tattebai sima forms a good mark by which to recognise the entrance to Kata ura, the eastern entrance point of which is 2 cables from it, and may be passed at a distance of half a cable.

Directions.—The coast in the neighbourhood of Kata ura is much broken, which together with the high land behind it, causes the entrance to the harbour to be somewhat difficult to make out. As foul ground extends for about two-thirds of a mile in a northerly direction from the eastern entrance point, care should be taken to keep well over to the westward, until sufficiently close to make out the two small islets off the entrance, between which is the fairway in, 2⅔ cables wide.

Anchorage.—A large ship will find the best anchorage in 12 fathoms abreast the village (Kata mura); with the summit of Kan no sima open its own breadth of the east entrance point. A ship of moderate size may anchor farther in, with the east extreme of the same islet in line with the east entrance point. The anchor should be immediately let go when the summit of Noma no take (1,964 feet high) is seen south of a hill (715 feet high) on the west side of the harbour. Vessels should not anchor nearer the head of the harbour than in this position, as it is shoal for some distance from the shore in this direction, and there are patches of unfavourable (rocky) holding ground. The holding ground elsewhere is good, the bottom being generally composed of stiff mud, but in about the middle of the harbour are some patches of rock.

Supplies.—Fish and fowls, and occasionally a bullock, may be obtained at the villages. Ten miles from Kata mura is the post town of Kaseda, distant only a day's journey (on foot) from Kagosima. Horses may be procured if required.

Tides.—It is high water, full and change, at Kata ura at 6 h. 55 m.; springs rise 8 feet; neaps rise 2 to 3 feet.

The COAST from Kata ura northward as far as Naga saki bana, a distance of 19 miles, is a long stretch of sandy beach, broken only here and there by the mouths of small streams, or by low, rocky, shelving points. For nearly the whole of the distance the beach is fringed with trees, the land behind forming in low hills covered with cultivation. Kinposan, a very conspicuous mountain forming three summits, 2,100 feet high, lies about 10 miles north-east of Kata ura and about 4 miles from the coast. Thence northward a range of hills, gradually diminishing in height, extend parallel to the shore.

Nagasaki bana, is a rocky shelving point, with a dangerous reef extending southward of it for more than half a mile.

Futa sima, a square, solid looking, bare rock 126 feet high, lies 5 miles from the shore; and the same distance N.E. ½ N. from Noma no hana. It may be approached close-to on all sides.

HASHIMA URA.—From Nagasaki bana the coast trends to the north-westward for a distance of 4½ miles to Hashima saki, forming a double bight, in the northern part of which is situated the village of Hashima, containing (in 1879) about 780 inhabitants.

Anchorage.—Good anchorage may be had off the above-mentioned village in 7 fathoms, sheltered from northerly and westerly winds. The best position is with the north extreme of Okino sima in line with

Hashima saki bearing W.S.W., and the extreme of the village stone camber bearing N.N.E. ½ E. The beach, composed of sand and boulders of rock, is fringed with rocks which cover at high water.

Okino sima, a small densely wooded island, 301 feet high, lies 4½ cables south-west from Hashima saki, between which and the island is a clear channel.

HASHIMA SAKI.—From Hashima saki the coast trends to the north-north-west for 3 miles to Yoshiku misaki, forming a mass of high land, the highest point of which, Taki no koba (1,694 feet in height), lies about 2¾ miles north-east of Hashima saki. This peak is wooded on its eastern side, and its western slopes are covered with grass. Around it are numerous other hills, the slopes of which are densely wooded, interspersed with patches of grass.

Kamo sima, a small tower-like rock 20 feet high, lies N.N.W. 4 miles from Hashima saki, and one mile from Yoshiku misaki, and the shore abreast it; it may be passed close-to on its western side. The tidal streams run strong in its vicinity.

Sendai kawa, a river navigable for boats for a distance of 20 miles, enters the sea 3½ miles northward of Yoshiku misaki. At its entrance is the village of Gumisaki consisting of about 400 houses, with a population (in 1879) of about 2,000. The inhabitants are principally fishermen. The coast between Yoshiku misaki and the entrance to Sendai kawa is composed of a sandy beach off which the water is shoal for some distance, and several small rocks lie off it.

Tides.—Between Me saki and Noma no hana the flood stream sets to the northward along the coast, and the ebb tide to the southward, attaining at spring tides a velocity of from 2½ to 3 knots an hour. The stream sweeps round the bays, causing tide-rips off the prominent points.

OTENTOSAMA SEA, an arm of the sea formed between the western shore of Kiusiu and numerous islands (the principal of which are Amakusa, Oye sima, and Naga sima) to the eastward, extends in a north-east direction for 41 miles with an average breadth of 6 or 8 miles. This inland sea is studded with islets and rocks, and it communicates by two channels with the Oyano sea and Simabara gulf.

Naga sima, a large island about 10 miles in extent, lies at the entrance to this spacious inland sea, leaving only narrow channels on either side.

To sima, at head of channel leading to Usifuka is a perfect cone, showing over Kasu sima from the offing. Imi sima, 5 miles to the north-east, has the shape of a truncated cone.

Kuro no seto, the southern entrance to the Otentosama sea, is a safe and clear strait; there is one rock only on the western shore, and it is close in, and shows at low water. The tides run with very great velocity in the strait, which should only be passed through at slack water.

Sisi sima.—The channel inside the Otentosama sea, between Sisi sima and the islands to the westward, is foul. The island next west of Sisi sima has a small islet to the north-east of its north point. Reefs, which show at low water, extend north-westward of the north point of the island, and also 2 or 3 cables to the north-east of the islet.

The islands Sisi sima, Kosoura, and Toyi sima, are high and steep; the same description applies to the south-eastern shore of Amakusa.

Between the north point of Sisi sima and the west point of Kosoura sima, is a remarkable dome-shaped islet and rock, above water.

The northern part of Otentosama sea is shoal, and blocked by sandbanks and rocks; some are buoyed, but the assistance of a pilot should be obtained.

AMAKUSA, a large island 23 miles in length, lies S.S.W. of Simabara peninsula; between them is the western entrance to Simabara gulf, only 2½ miles in width. Two harbours, Tomioka, and Sagitsu no ura, on the western coast of the island, afford shelter.

Kotame bay, on the south end of Amakusa, is well protected by Kasu sima. A reef lies in the centre of the bay above water with a passage carrying from 13 to 16 fathoms on each side of it, and three other detached reefs, which always show above water, lie on the eastern shore closer in. The depth in the bay is from 13 to 16 fathoms, shoaling to 8 or 9 fathoms at one cable from the shore. In rounding Kasu sima do not approach too near the south-east rock, as reefs have been observed, on which the sea broke heavily, outside this rock.

Koto no ura, a bay on the south-west side of Amakusa, has a series of detached reefs in its centre, and there appears to be no anchorage for anything but native craft.*

SAGITSU NO URA,† about 5 miles north of Koto no ura, is a narrow inlet (forming several bays and smaller inlets) extending eastward 4½ miles. The channel leading to the narrow passage into Sagitsu no ura is rocky and uneven. Only 4 fathoms can be carried at low water along the northern shore, at the outer entrance of the narrow pass which separates the outer from the inner part of the inlet; as a shoal of less than 3 fathoms, extends 2 cables northward of the west point of the entrance to Kame ura. Kame ura (Cormorant inlet), a narrow inlet on the south shore, is also almost closed by a bank of shingle which extends across its entrance, and in the channel there is only a depth of one fathom at low water.

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* Lieutenant J. Elwyn, commanding H.M.S. *Slaney*.

† *See* Admiralty plan:—Sagitsu no ura, No. 135; scale $m = 2 \cdot 8$ inches.

Pinnacles.—There are two rocks nearly 2 miles north-westward of the entrance, the southern of which forms two pinnacles, the northern being low. These two pinnacle rocks, off the entrance, are good landmarks to point out the harbour. The land round the harbour is high and well cultivated.

Care should be taken in going through the narrow pass between Sasinotsu and Kame ura, as there is a sunken rock off the north point, on the port hand entering.

Oonska saki is low and red composed of boulders embedded in clay quantities of which have been removed, considerably altering its appearance and necessitating caution when rounding it, to avoid the 3 fathom bank off it.

The head of the inlet is shoal, and in a bight in its north-east part a small river flows into it through mud banks which dry.

After passing north point keep the northern shore on board until Kame ura opens out. Round the promontory facing Kame ura at half a cable until the channel leading to the inner anchorage opens, when anchor as convenient.

Anchorage.—The best anchorage is half a mile north-east of the narrow pass, off a small island (Mia-ga sima), in 7 to 10 fathoms, perfectly sheltered from all winds.

Caution.—There appears to be a reef extending from the Pinnacle rocks in a N.NE. direction towards Taka hama, a rock about 2 miles from the Pinnacle rocks.

Supplies and water can be obtained at Sasinotsu, the principal village; beef is moderately cheap.

Tides.—It is high water, full and change at Sagitsu no ura at 8 hrs. 0 m.; springs rise 9 feet.

TOMIOKA.—About 14 miles from Sagitsu no ura is a lagoon-like harbour on the eastern side of a small peninsula, which forms the north-west point of Amakusa. The harbour is formed by a low sandy tongue of land covered with trees, curving round to the westward and enclosing it, giving complete shelter. The entrance is from the south-east by a channel carrying 5 fathoms water close along the south side of the low tree-covered tongue which forms the eastern side of the harbour. The deep part of this channel is only 150 yards broad; a vessel should therefore be steered in at that distance from the shore on W.N.W. course, with the village of Tomioka ahead, carrying 4½ to 5 fathoms, and may anchor in the centre of the harbour in 6 fathoms. It is very shallow off the south shore at entrance, but a flat of 3 fathoms borders the channel, making it for that depth a quarter of a mile in breadth.

SIMABARA GULF.—Of this large gulf, which extends 70 miles into the heart of Kiusiu, comparatively little is known. Simabara, a large and broad peninsula, so situated as to make the gulf an inland sea, has on the eastern shore a city of the same name. In the centre of the peninsula is an active volcano (Uzen), 5,000 feet in height, the summit of which is extensive and rugged, over which a dark cloud of smoke usually rests; a second summit to the eastward is divided from the other by a steep valley. This is the focus of a wide volcanic region, and is associated with some of the severest earthquakes on record, one of which, in 1793, was felt throughout the whole of Kiusiu, and is said to have changed the configuration of the whole coast line of the adjoining province of Higo, and the general form of its territory.

The eastern peak or summit of Simabara has been on its eastern side evidently at some time subject to a landslip that has hurled one-third or more of the mountain side into the adjacent sea, and upon the débris it seems that the present town of Simabara has been built. Other parts of apparently the same slip constitute the numerous patches and hillocks above water that encumber the harbour entrance, as the hillocks are not rock, but are composed of loose rounded stones, clay, sand, and pumice; such islets are frequently washed away during typhoons. The peninsula slopes gradually to the northward and southward, but is steep on the eastern side. The land on either side of the gulf is of moderate elevation.

The gulf is entered by the Haya saki channel about 2½ miles wide.

A rock which uncovers 5 feet at low water, lies at the entrance of the gulf; it bears N. 20° W. from the east extreme of Tsuji sima, and N. 64° W. from east extreme of Oösima.

HAYA SAKI CHANNEL.—The passage into Simabara gulf, north of the "5 feet rock," seems preferable, as it is less exposed to the force of the tide, which here runs with great velocity and produces whirlpools. Great care is therefore requisite in steering a vessel; this rock always shows, except at high-water springs. Southward of the "5 feet rock," between it and Tsuji sima, several rocks have been reported showing at low water; the Japanese do not use this channel.

Yu sima, flat topped, is seen ahead on clearing the entrance. Passing north of the island the double peaks will be seen ahead. The passage between Nokona and Yu sima has been frequently used, but no soundings have been obtained in it.*

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* Mr. Pendered, commanding S.S. *Thabor.*

The points Kuchinotsu, Ohoya, Ohoye (south coast of Simabara peninsula) are of moderate elevation; Futsu saki and Do saki farther east, are low, and from the offing cannot be distinguished.

Abreast the town of Simabara, a bank having a depth of 3½ fathoms on it, extends at least half a mile from the shore. There is probably no safe anchorage close to Simabara. To the southward of Do saki, Ohoye, and Kuchinotsu there is probably safe anchorage.

The eastern side of Simabara gulf seems shoal throughout; but the lead may be considered a safe guide in approaching the bank.

Rock.—Another rock, which uncovers 7 feet at low water, lies nearly in the centre of the head of the Simabara gulf; from it Take saki bears S. by W. ¼ W. and Siwoda gawa N.W. by W. ½ W. A rocky reef also stretches from Take sima point in a south-east direction for 1½ miles. The head of Simabara gulf is shallow and full of dangers, and vessels navigating it should avoid the very turbulent "chow-chow" or disturbed water.

Kuchinotsu,[*] is a junk harbour, in which was seen a Japanese barque of 300 tons.

LIGHTS.—From a white brick tower, 16 feet in height, situated on the western entrance point of Kuchinotsu harbour, at an elevation of 126 feet above the sea, is exhibited a *fixed* white light, seen from seaward over an arc of 248° or from E.N.E. (round by north and west) to South, and visible in clear weather from a distance of 8 miles.

Also from a white brick tower situated on a small island (at the northern entrance to Simabara anchorage) at an elevation of 35 feet above the sea, is exhibited a *fixed* white light, which should in clear weather be visible all round from a distance of about 6 miles.

Tsikugo gawa, a river situated at the head of Simabara gulf, is reported to have a depth of 12 feet on the bar. The foreshore is very low, but the land at the back is high. Saga, a large and opulent city famed for its porcelain ware, is situated on the north shore of the gulf near this river.

Tides.—At the town of Simabara the springs rise is 14 feet; in the southern part of the gulf the range is greater.

EAST COAST of NAGASAKI PENINSULA.—About 22 miles of the eastern side of the Nagasaki peninsula has been surveyed. It has generally a bold steep coast, but there are several places on it where a vessel blown to leeward of Nomo saki by west winds, will find anchorage and good shelter from them.

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[*] Kuchinotsu is the place of shipment for the coal produced at the Muke mines. The output of coal for the year 1879 was 116,991 tons, or an average of 390 tons per day for 300 days.

MAKE SIMA encloses on the north-east a harbour for small vessels, having from 10 to 12 feet water, accessible by two narrow passages; that on the east towards the sea, has a depth of only 9 feet between the reefs at entrance, which is scarcely a cable wide; the western one from Aba bay is about the same breadth, and carries 2 to 5 fathoms for three-quarters of a mile along the north shore of Make sima. There is a road or bridle path to Nagasaki through the valley, only 3 miles distant from the head of Aba bay.

ABA BAY, is rectangular in shape, 1¼ miles deep, and one mile in breadth. There is anchorage in the centre of the bay in 7 fathoms, open only between South and S.E. The eastern side of the bay is formed by Make sima, which has some islets on the reefs on its south side, one of which extends 4 cables. There is a boat camber at the village on the western side of the bay.

Mogi bay, another small bay, is 3 miles S.W. from Aba bay. Small craft can anchor in from 3 to 6 fathoms, sheltered except from South to East; and larger vessels in from 9 to 11 fathoms off the entrance.

Tameitsi and Sitziwura bays.—Tameitsi bay is 5½ miles S.W. from Mogi. Steer for the village at its head, and when Kaba sima shuts in behind the southern part of the bay anchor in 10 fathoms or less, about 2 cables off shore. Sitziwura, a small bay 2 miles farther north-east, has anchorage in 9 to 10 fathoms, at 2 cables off shore. There is an islet or rock on the reef which extends 2 cables off the south point of the bay; it lies directly under and S.E. of the highest peak of Kawara yama.

Between Sitsiwura and Mogi bays, there are islets and reefs which extend 2 or 3 cables from the shore.

MISAKI BAY,[*] north of Kaba sima, and east of the low jutting point and sandy beach where stands the large village of Misaki, affords anchorage in 7 to 11 fathoms. It is gained from the westward by rounding at 2 cables distance, the south and south-east points of Kaba sima the latter being a steep head, from which steer to pass outside a low reef (East rocks) one mile N. by E. of that head, which being passed steer N.W. ½ W. into Misaki bay, and anchor either in 10 fathoms east of the flat rocks (on which will probably be seen a large bamboo erection used by the fishermen, whose nets it will require care to avoid); or, passing north of the flat rocks anchor in 7 or 8 fathoms in the bay. On the north side of the bay the water deepens to over 10 fathoms. Off the southern point (a low wooded head) are some islets also wooded, and some rocks which form a second bay; but it is too small for anchorage.

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[*] Misaki, Tameitsi, and the coast east from Aba are in the territory of the Prince of Fizen.

Misaki bay can also be approached by a channel less than a cable in breadth, carrying from 6 to 17 fathoms, by passing along the north shore of Kaba sima, and keeping a mid-channel course. The sunken Bay rock is half a mile west of the entrance. Between the East rocks and the reefs of Kaba sima there is only a narrow channel carrying a depth of 4 fathoms.

Supplies.—Fish is plentiful here, and lampreys, and the fishermen eager to sell.

KABA SIMA, is covered with steep hills about 400 feet in height, a clump of trees surmounting one of the southern; its sides are mostly bold and abrupt, with rocks a cable off them, and a sunken one lies at this distance off the shelving rocks off of its south point.

Kabasima bay, between Nomo saki and Kaba sima, affords anchorage at its north-western part open only between S.E. and S.W. Here reefs which dry project 1½ cables from the shore; at 2 cables from the shore there are 8 fathoms, and at 4 cables distance 11 fathoms, about E.N.E. of the Nomo rock. The eastern part of the bay, where a long sandy beach is seen, should be avoided, there being a sunken rock (Bay rock) on which are 6 feet water with 4 and 6 fathoms about it. It lies E. ¼ N. 1½ miles from the Nomo rock, and N. ¾ W. of the west point of Kaba sima at half a mile from the shores of island and main.

NOMO SAKI, is the south-western extremity of the peninsula of Nagasaki. At a distance it has the appearance of an island, and when nearing it, cannot be mistaken for any other land in its vicinity; from the west or south-west Kaba sima will be seen off the low point east of the cape. At 6 cables north of the cape is Nomo saki, which rises steeply to the wooded summit of a prominent hill, Nomo yama, immediately beneath which, on a small bare shoulder towards the sea, stands a look-out house; the hill slopes towards the cape in two gently descending ridges of small hills, the coast between being broken and rocky, and skirted with dangerous reefs which dry out in patches to a quarter of a mile; but it may be passed at the distance of 4 cables in 12 to 17 fathoms, gravel and rock bottom. At 2 cables off the cape is an inaccessible islet called Nomo rock, which is surrounded by small, low, detached rocks, most of which cover.

Nomo ura, the entrance to which is one mile north-east of Nomo saki, is small and perfectly sheltered, 6 cables in length and from one to 2 in breadth. Within, there is a depth of 5 fathoms, but it is only accessible to small vessels, having not more than 9 to 10 feet at high water in the deepest part of its narrow entrance, which is only 100 yards across and 2 cables in length. The northern point of entrance is a small, dark, wooded, but conspicuous bluff; the southern, the foot of the range of hills next north of Nomo yama. Off the wooded bluff are reefs and uneven ground, so that the harbour should be approached on a S.E. course, taking care to keep rather along the southern shore when entering.

WEST COAST of NAGASAKI PENINSULA.—From 10 miles outside the islands fronting the west coast of Nagasaki the soundings decrease gradually over a bottom chiefly sand, until 30 fathoms is obtained, which will be at a general distance of a mile from all the outer islands; the only exception is an 18 fathoms spit which extends one mile north-west of the Sotonohirase rock, and the extremity of which is 1⅓ miles W.S.W. of the north-west point of Iwo sima. Inshore of this island the bottom in the fairway is of mud, gravel, or rock.

IWO SIMA, lies in a north-west and south-east direction and is 1$\frac{1}{10}$ miles in length, of undulating outline, the eastern summit being 400 feet in height.

Signal head, the north-western point of this island, is a good guide for entering the harbour of Nagasaki. It is bold and may be rounded at 3 cables distance in 25 fathoms. On its summit, which is cleared of trees, there is a lighthouse and signal staff, from which the arrival of vessels is telegraphed to Nagasaki.*

LIGHT.—From a lighthouse 35 feet high, hexagonal in shape and painted white, situated on Signal head, at the entrance to Nagasaki harbour, at an elevation of 205 feet above the sea, is exhibited a *fixed* white light of the first order, seen seaward between the bearings of N.E. by N. (round by east and south) and W. ¾ N.; it should be visible in clear weather from a distance of 21 miles.

OKI SIMA, of much the same height as Iwo, is more wooded, especially its southern summit. There is access to the Nagasaki harbour by the channel east of Oki, between it and Koyaki. Iwo and Oki appear as one long island, although separated by a narrow boat passage.

Hirase rock, which covers at high water only, lies 4 cables from the eastern shore of Iwo sima, and E. by S. ¼ S. 11 cables from Signal head; and although not directly in the fairway, is in the route of vessels beating in and out of Nagasaki harbour. There do not appear to be any other dangers near it. The bluff of Papenburg island, bearing E. ½ S., leads 3 cables northward of it.

Beacon.—A conical stone beacon surmounted by a ball, 20 feet high, and painted red and white in horizontal bands is erected on Hirase rock.

Sotonohirase rock, also covering at high water, lies 9 cables off the south-west shore of Iwo sima, and S. by W. ¼ W. 1¼ miles from Signal head. It is steep-to in 17 fathoms on the outside, but this depth is continued on a spit running one mile N.W. by W. from the rock, its outer part in 18 fathoms being W.S.W. 1⅓ miles from Signal head, with 37 to 38 fathoms on all sides.

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* Literally, Long cape.

Kutsno se and Kuro se rocks.—The Kutsno se, 10 feet above high water, lies inshore of the Sotonohirase, at 1½ cables from Iwo sima.

The Kuro se, is a large straggling reef, of which the southern and highest part is 15 feet above high water. North and north-west of it several reefs dry in parts, on the foul rocky ground between it and the south end of Oki, from which it is distant 4 cables.

TAKA SIMA, a small island about 7 cables in extent, lying three miles S. by W. of Signal head, has a precipitous ridge about 900 feet high on its eastern side, and a smaller ridge over the cliffs on its western or sea-face. Its shores are very rugged, with reefs extending 1½ cables off its north and west points. There are coal mines in operation on the east side of Taka sima, from which coal of a very fair quality is mined.* The only anchorage is on the west side of the island in from 2 to 7 fathoms on a bank of coal and sand, which at 3 cables from the shore deepens suddenly to 15 and 20 fathoms. Small vessels might anchor there in fine weather and smooth water, but the anchorage is neither of sufficient extent or protection to be in any way recommended to H.M.'s ships requiring coal.

Tobi and Futako sima.—Three small islands, about 120 feet high, Tobi sima to the north, and Futako sima (two islands) on the south, lie in line, north and south of its east face. The latter two are connected, and fringed by reefs.

Hi sima and Nagano sima, 1½ and 2 miles S. by W. and S.S.W. respectively, from the summit of Taka sima, are smooth-topped islands, about 120 feet in height; with rocky shores and with reefs extending more than a cable off their southern points. Nagano sima is 4 cables S.W. of Hi sima, there being deep water (about 14 or 16 fathoms) in the passage between them.

Mitzuse rocks, the outermost dangers in the approach to Nagasaki from the south, lie 3½ miles S.W. of Taka sima, and N.W. ½ W. 2½ miles from the summit of Nomo saki. They spread irregularly over an extent of half a mile, the interior rocks of the group covering with the tide. On the northernmost rocks are two pointed islets, 60 feet in height, with outlying patches on the east and west; the south-eastern of the group is a bare rock about 6 feet above high water. At one cable westward, or outside the rocks, there are 23 fathoms, and no outlying dangers are known; but it would not be prudent to pass between the rocks although the water appears deep.

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* The coal mines are worked by the Japanese Government, and as much as 500 to 1,200 tons can be turned out daily if required; the coal is firm and good.—Captain B. Bax, H.M.S. *Dwarf*, 1874.

The COAST.—The coast of the peninsula northward from Nomo saki is bold with a few outlying rocks, and may be passed at 2 or 3 cables in 10 to 13 fathoms, water. To the north-east of Nomo ura the coast is low as far as a hilly point 2 miles distant. Off it are several long reefs drying out in patches. On the southern of these reefs, at half a mile N.E. of the entrance of Nomo ura, is a tree islet 120 feet high, with shoal water extending 2 cables to the north-west of it. No part of this coast should be approached within half a mile, the ground off it being uneven and rocky.

The coast for 3 miles N.E. by N. of this hilly point is bold, with depths of from 5 to 9 fathoms near the shore. It lies under a succession of hill ranges, which terminate at a point abreast a group of rocky islets, north of which point the small bay of Ōoko muri affords anchorage in 6 to 8 fathoms. A conspicuous, smooth-topped, conical islet, south of the islet group, is very noticeable close off this coast.

Suzume, a bare rock, about 50 feet high, is the north-western of this group of islets. No sima, the southern, and all the other islets, are wooded and low, and surrounded by large reefs. There is a 5 fathoms channel between No sima and the coast, but the islet must be closed in passing, as a large reef projects from the shore. Suzume may be rounded at 3 cables on its west side in 15 fathoms (bottom of rock or gravel), but at that distance N.N.E. there are only 5 fathoms.

KOYAKI.—Koyaki is the largest island off Nagasaki, and is situated directly south-west of the entrance, which may be gained by the channels both east and west of it. This island is not high, but very hilly, its two chief elevations being 371 and 412 feet. Numerous reefs and islets border its broken outline.

Joka sima and Hadagase, an islet and a rock, lie about W.S.W. at 5 and 8 cables respectively, of Mumenoki, the south point of Koyaki, with from 15 to 18 fathoms inside them.

Hadagase, is probably united to Joka sima, as the large reef on which that islet stands stretches far towards the rock, as it also does towards Mumenoki. Hadagase may be passed at 4 cables on its west side in 26 fathoms. The large bay on the northern side of Koyaki has from 17 to 20 fathoms water, and, besides being too deep for convenient anchorage, is open to the north-west swell. On the eastern side of Koyaki there is a mass of reefs in the South channel.

KAGENO, a small island about 3½ cables in extent and 218 feet high, appears part of Koyaki; as it is only separated from its north point by a narrow boat passage.

Naginato, or Hungry rock, which covers at high water, lies a cable east of the north-east point of Kageno, off which is a small islet.

LIGHT.—From a lighthouse 16 feet high, situated on the north point of Kageno sima, is exhibited at an elevation of 40 feet above the sea, a fixed *red* light, visible between the bearings of E. by S. (through south) and N.W. ½ W.: it should be visible in clear weather from a distance of 8 miles.

KAMINO SIMA, at 6 cables north of Kageno, is the largest island on the northern side of the fairway to Nagasaki. Its north hill is elevated 330 feet, and on its central hill, which is lower, is a signal staff. On the east side there is a small boat camber; on the south-west the small flat island of Siro sima, on which there is a battery, is connected with a work on Kamino sima by a causeway of masonry. There are other batteries on Kamino sima, all of which command the passage.

Aino sima and Mats sima.—North-westward of Siro sima are the two small islands Aino sima and Mats sima. Aino sima, 1½ cables distant, is a flat table island, about 60 feet in height, on a reef; with a conspicuous rock* close off its south point. Mats sima, 5 cables N.N.W. from Siro sima, is 100 feet high. There is deep water in the passage between Siro sima and Aino sima.

Barracouta rock.—Off Kabuto saki, the south-east point of Kamino sima, on which there is a battery, are some small islets. One cable from these, S.W. of the Tree rock, and W. by N. of the south bluff of Papenburg, is the Barracouta, a sunken rock, which may be cleared to the southward by keeping the summit of the coast range (800 feet) over Megami point open of Papenburg, bearing East.

Papenburg, or Takaboko, 2 cables south-east of Kamino sima, is a small precipitous island covered with dark foliage, and is very conspicuous when making for the entrance to the harbour. It may be passed at half a cable in 18 fathoms.

Nezumi sima.—To the N.E. of Takaboko, and distant one-third of a mile, is a small flat wooded island Nezumi sima,† lying off the small bay of Kibatsu, east of the large village of Kosedo. Shoal water extends nearly one cable S.E. from the south-east part of Nezumi sima, and foul ground continues in the same direction for 2 cables.

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* This rock or islet was the observing place of Belcher, in 1842, from which several meridian distances were measured to Liu Kiu, Quelpart, &c.

† The observing place of Richards in 1856, from which meridian distances were measured to Hong Kong, Hakodate, &c.

CAUTION.—Swinger rock, a dangerous sunken rock about 8 feet square, on which there is a depth of only 4 feet at low water, lies nearly midway between Ogami point and Takaboko sima (Papenburg island), and in the fairway of the entrance to Nagasaki harbour. This rock may be dangerous for steam ships leaving the harbour when passing another vessel in its vicinity, or for sailing vessels working in. Care must be taken, therefore, to keep Signal head well open of Kabuto saki fort, when passing in the vicinity of that danger.*

NAGASAKI HARBOUR,† is a large and commodious inlet thoroughly sheltered from all winds, and available for ships of all classes. From its entrance, which is 3 cables wide between Ogami point on the west and Megami point on the east, its direction is N.E. by N. to the city, a distance of 2 miles; increasing to a breadth (although irregularly, owing to several bays on its shores,) of three-quarters of a mile. Above the city it narrows again, taking a more northerly direction for another mile to its head, which is very shallow. The depths decrease gradually from 16 fathoms at the entrance to the harbour, to 4 fathoms off the city.

Ogami point, the western point of entrance to Nagasaki harbour. has a battery on it, and a temple stands on the south extreme of the point, A sunken rock lies about 70 yards south of the east extreme of Ogami point.

Megami point, the eastern point at the entrance to Nagasaki harbour, is at the foot of a steep ridge, on which are three batteries, one above the other. Within Megami point 1½ cables (a small islet lying between them) is another point, on the extreme of which, in a battery, is a remarkably large tree.

The Hishiwo bank, which fronts the shore from De sima to the foreign settlement, is a good and convenient place for grounding. Its western edge is steep, but off De sima, W. by S. of the Dutch consulate flagstaff, the bank is very flat. This is the anchorage recommended especially for gunboats and other small vessels.

Approaches to the harbour.—Fairway channel.— The harbour has three approaches. The principal one or fairway is directly from the north-west, the entrance to which, 4 miles outside the harbour, is between Fukuda saki and Iwo sima light (*see* page 501). This channel carries deep water, 32 fathoms, decreasing to 20 in the passage between Papenburg and Kageno, and again to 15 and 16 fathoms at the entrance of the harbour. Vessels entering Nagasaki harbour should invariably use this channel.

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* Discovered by H.M.S. *Swinger*, Lieut. Bolitho, 1876.

† *See* Admiralty plan:—Nagasaki harbour, No. 2,415; scale $m = 2{\cdot}8$ inches.

Oki channel.—The second approach is by the Oki channel, between Oki sima and Koyaki, but it is only 3 cables in breadth, and further narrowed by the reefs which extend into the channel 1½ cables from either shore. There are irregular soundings of 7 to 19 fathoms in it, and the best course through, is midway between the reefs which are seen. Neither this channel nor its approaches have yet been thoroughly examined.

The Kuro se, a rocky islet with reefs projecting from it (*see* page 502), lies in the fairway to the entrance to Oki channel, from the southward.

South channel.—The third approach by the South channel, between Koyaki and the main, can only be used by steam vessels. Narrow, and intricate amongst the reefs, with soundings varying from 4 to 15 fathoms, it cannot be recommended, and can only be taken at the risk of the navigator. The chief danger is a sunken rock in the narrowest part of the channel, where it leads between two large flat-topped rocks, 4 cables north of Fukahori point, and which should be passed at the slowest speed compatible with good steerage way. These rocks, which never cover, are but one cable apart, and the sunken rock is half a cable N.W. by W. of the eastern one. The whole of this channel is so encumbered with rocky patches that instructions for its navigation would not be sufficient; a local pilot would be necessary, and it should never be taken without one.

The CITY of NAGASAKI, a treaty port, at present second only in importance to Yokohama, covers a broad valley on the eastern side of the harbour, surrounded by lofty hills. Its population in 1858 amounted to nearly 70,000.* Nagasaki is one of the five imperial cities of Japan, and is under the jurisdiction of a governor holding his appointment from the Mikado. It was the only place of trade open to foreigners between the years 1623 and 1857.

De sima, the historic site of the Dutch factory, projects into the harbour on the south-west side of the city with which it is only connected by a stone bridge. Shaped like the border of a fan, it is 250 yards in length and 80 in width, and is traversed by a central street. De sima contains the residences and warehouses of the Dutch community, the consulate being situated at its south-west angle. At the broad steps at its west end is the best place for landing at the city.

The Chinese community occupy the square secluded block of houses S.E. of De sima, connected with the shore by a bridge. They compose a trading guild and factory.

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* In 1877 the population was only 30,000.—Captain St. John, H.M.S. *Sylvia.*

The Foreign settlement is on the flat south of De sima, having a water frontage of 730 yards; it also stretches up the valley on the Owara creek on the south. The British consulate is upon the bluff south of this creek, where there is a good landing place. There are also two landing places in front of the settlement, but only the lower one can be approached at low water. The American, French, and Portuguese consulates are on the hills at the back of the settlement.

The Japanese custom houses (3 buildings) are situate on the bund. The exports consist of tea, silk, coal, vegetable wax, gall nuts, copper, gold; also various articles for the Chinese market, as dried fish, sea slugs, seaweed, peas, beans, &c. The imports consist of manufactured goods, metals, and various articles of mixed merchandise, with the exception of munitions of war, which, by the 14th article of the treaty, can only be sold to the Japanese government and to foreigners.

The total value of exports for the year 1879 was less than it had been for the last three years, but was still in excess of the imports. There was a slight falling off in the number of foreign vessels visiting the port, and a large increase of vessels under the Japanese flag, partly due to the increasing trade between Japan and the Korea.

Telegraph cable.—The Danish Telegraph Company's submarine cable is landed on the peninsula of Senbon. From thence the cable is laid in a westerly direction, passing northward of the islands Kageno and Iwo sima. Four marks point out the position, and vessels are forbidden to anchor in the vicinity.

Supplies.—All provisions are plentiful (mutton excepted), cheap, and easily obtained, as also is wood and water; the latter is brought off in boats to the shipping. Coal is abundant, at 9 to 11 dollars a ton, but is of inferior quality for steaming purposes, especially for high pressure boilers. There are numerous mines in the vicinity, one of which is in operation at Taka sima (page 502).

There is a Japanese government steam factory and arsenal at Akunora on the west side of the harbour, where there are facilities for executing repairs to iron ships.

Dock.—A dock, the extreme length of which is 420 feet, breadth of entrance 89 feet, depth over sill at high water 27 feet, is also on the west side of the harbour, one mile south of the arsenal.

In April 1882, there were depths of 27 to 37 feet, at high water spring tides immediately off this dock, and the bottom was level to the north-eastward.

A bank with 18 feet at high water, extends 1½ cables E.S.E. of the south frontage of the dock, and this rises to a ridge with only 8 to 14 feet over it at high water. A post marks the shore end of the ridge which sometimes dries, and a red pear-shaped buoy the outer end. The dock should, therefore, be approached from northward of East.

A ridge with 24 feet over it at high water, existed across the actual entrance, 20 yards outside the caisson, but this was being deepened to 27 feet.*

Buoy.—A red mooring buoy is moored in 34 feet at low water springs, and a vessel 400 feet long, would just swing clear of the bank at half tide.

Patent slip.—Dimensions of slip: Length of rails 550 feet; carriage 20 feet. Depth of water fore part 11 feet, after part 19 feet at spring tides. The rails are all laid on stone and the slip is capable of taking a vessel of 1,600 tons.

Time signal.—A gun is fired at noon (local mean time), a red and white triangular flag being hoisted 5 minutes before.

Anchorage.—The usual anchorage for men-of-war is just above the British consulate bluff, large ships anchoring in from 6 to 7 fathoms rather over towards Minage point,† at this the broadest part of the deep water of the harbour. Merchant vessels usually anchor off the foreign settlement in from 4 to 6 fathoms, or even above De sima in 3 fathoms. The best holding ground in the harbour is said to be on the west side of the harbour, between Minage point and the Russian storehouses. In the hot weather of July and August great relief may be experienced from the closeness of the atmosphere, and it will be beneficial to the health of the crews‡ to spring the ship's broadside to the sea breeze, which, in fine weather, is almost constant from the S.W. and generally very fresh until about middle of August when land and sea breezes occur.

The best anchorage for holding ground and weather, being clear of town, creeks, and drains, is with Owara creek, bearing S. 55° E., Minage point S. 50° W. in 6½ fathoms.§

Tides.—It is high water, full and change, at Nagasaki, at 7h. 15m.; springs rise 9 feet, and neaps about 7½ feet, but they are variable. The current in the harbour is always sluggish. A strong southerly wind is said to raise the level of high water at spring tides 2 feet above the ordinary level.

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* The dock authorities are busily engaged removing obstruction to the entrance.—January 1882.

† The rock on the south side of Minage point is a convenient and quiet spot for taking observations.

‡ The general health of Europeans during the summer months at Nagasaki is not good. After heavy rains the water in the harbour is very muddy and smells offensively; the atmosphere too is very hot and humid. The different atmosphere outside the harbour is very marked.

§ The anchorage to the northward and inshore of the Mitsu Bishi Company's hulk (which is moored off Owara creek) should be avoided, as the surface of the bottom is composed of about one foot of soft slimy mud (covering a hard bottom) through which light anchors drag easily.

Directions.—The entrance to Nagasaki harbour, although safe of approach, is sometimes difficult for a stranger to make out from a distance, especially in clear weather, when the islands blend with the mainland; but on nearer approach, or in slightly hazy weather when the islands appear in relief, the uncertainty is removed. It is said that vessels from the south-west are very liable to make the entrance south of Iwo sima.

When making Nagasaki from south-west or west, steer to round Signal head (the north end of Iwo sima) at a quarter of a mile, taking care not to bring the light to bear northward of N.E. by N. (on which bearing it is obscured) on approaching it. By keeping the light in sight or during the day keeping the north point of Iwo sima, bearing eastward of N.E. by N. will clear the shoal water off the dangerous Sotonohirase rock. After rounding the head, steer E. ½ S. for the Papenburg bluff, passing it as closely as convenient, but taking care to avoid the Barracouta rock; then E.N.E. for the entrance. At night do not bring Iwo sima light to bear northward of W. ¾ N.

Passing in mid-channel between Ogami and Megami points, a N.E. course direct for the Dutch flag on De sima will then lead up in the best water; and when the factory of Akunora, on the west shore, opens of Minage point, bearing N. by W., a large vessel should haul up N.N.E., and anchor in 6 fathoms between it and the British consulate or foreign settlement.

Approaching the harbour from the north-westward, the course from 1½ miles S.W. of Hiki sima, is S.E. by E. Iwo sima will be made without difficulty (appearing, end on, and under the mountain range of Kawara yama, the highest on the Nagasaki peninsula), and passing at about one mile northward of it, Papenburg will be seen showing over the three low islands outside Kamino sima.

There is little or no difficulty in entering or leaving Nagasaki at night, if the weather be fine, as the light on Signal head (Iwo sima) is visible 21 miles in clear weather, and the *red* light on Kageno sima now greatly facilitates night navigation; but should a vessel, from calms or adverse winds, be unable to enter, every endeavour should be made to get inside Papenburg if it be the intention to anchor; for outside this island the water is inconveniently deep, and it would be preferable to stand off and on till daylight, taking care not to decrease the soundings below 30 fathoms.

Outer anchorage.—Anchorage, can, however, be found in 20 to 26 fathoms over a bottom of thick green oaze with fine sand, good holding ground; or possibly rock or sand and shells if near the Hirase rock. A vessel will lie here sheltered from all winds except N.W., but exposed to the swell from that quarter. There is also anchorage east of Papenburg and Kageno, in from 13 to 17 fathoms, or in 11 fathoms on a bank S.W. of Megami point; the bottom here is mud and the shelter good except from West. Towards the eastern shore the ground is irregular and probably rocky.

FUKUDA SAKI, on the northern shore, 1½ miles N.W. of Kamino sima, is a bold headland 680 feet high, steep-to on its western side.

Teazer rock.—A rock with about 3 feet water on it at low water, and on which the sea breaks, lies 2 cables from the south-east shore of Fukuda saki, and on the western side of Fukura, a small bay eastward of the cape.

MIYE NO URA.—The entrance to which is about 5 miles N. by E. from Iwo sima light, is formed between Noöze (3 cables off the north point), and Kagura sima on the south side. It has a shoal of 2½ fathoms in the centre of the entrance, with islets and rocks off its northern shores, and rocks above water off the middle of the head of the bay. The depths are very uneven; but anchorage is said to be good at the head of the bay in 7 and 8 fathoms.

From the western point of the craggy island of Kagura, at 4 cables distance, is a small flat-topped isolated rock, with deep water close-to. Miye no ura extends 2 miles in a north-east direction, and the navigator should be cautious, as it is much encumbered with dangers.

Kashé (East rock), a square rock 162 feet high, with deep water around, lies 1¼ miles E. by S. ½ S. of Hako sima; and one mile off the coast.

Hako sima, a small round island, has off its west side the remarkable perforated rock Tengo, which is of considerable elevation, inaccessible, and has a sharp pointed summit. The perforation takes the shape of an arch, and this conspicuous rock, when seen from the southward, at a distance, resembles a ship under full sail.

HIKI SIMA, the outer and western island, has bluff capes on the south sides, is partially cultivated, and 250 feet high, with a remarkable cone-shaped rounded hummock at its south-east extreme, connected with the main part of the island by a long strip of shore; it is 9 cables long east and west. The channel between it and Ike sima has a rock in the centre, on which the sea generally breaks.

To the north-west of Hiki sima, a long ledge of rock uncovers at low water, but there are always some heads of the rocks visible. Its north extreme is 7 cables distant from the island, which should therefore not be closed nearer than one mile, nor should the passage between this ledge and Hiki sima be attempted.

IKE SIMA, lies one mile north-east of Hiki sima, and 1½ miles S. by W. of Mats' sima, and is flat, with trees on it. At its northern end a shingle beach encloses a salt-water lagoon.

The COAST.—From Miye no ura the coast trends in a N.N.W. direction to abreast Kashé, with bold points and sandy beaches, and moderately elevated coast range of hills, nearly all the points having off-lying rocks; an isolated rock, with deep water around, lies off the centre of a bay, 6 cables from the shore, and N.W. ½ N. 1½ miles from the outer low flat rock, off the northern point of Miye no ura. Vessels creeping up in shore must be careful of this rock; and nearly 2 miles S. E. ½ E. from Kashé are some rocks and islets, 3 cables off the shore.

Yuki no ura.—This bay is south of Hokimats', and is shallow at its head, with 1½ and 2 fathoms.

MATS' SIMA,* a large and well-cultivated island, on which are coal mines, is 2 miles long and 1¼ miles broad. The summit of the island is flat-topped, and 708 feet above the sea, the ridge running north-east and south-west, with spurs to the several points; the western side is more sloping, and the beach is of shingle, with moderate depths at 2 cables off the shore. An islet, 20 to 30 feet high, lies 4 cables off its north-west shores, with deep water around it; from the north point, islets and rocks extend in a N.N.W. ½ W. direction to a distance of 6½ cables, the outer patch of rocks partly uncovering at low water. Vessels should not round into the north-east corner (southward of Oösima) till Takabo cone bears N.E. by E.

Takabo, a conspicuous cone shaped hill of considerable height on the main land, with a clump of trees on its summit, is immediately over the coast, and overlooks to the northward a narrow inlet of the sea which runs parallel with the coast for 1¼ miles (at the head of which is Nanatsu Gama) carrying 5 fathoms in the centre for half a mile; the width of the channel being barely a cable.

The COAST.—Takabo is 3¾ miles southward of Otawa bay, and thence the coast trends to the northward in bends and indentations. Off Hokimats' is the islands of Mats', above-mentioned, from the north and eastern sides of which are numerous points, rocks and off-lying dangers. There is also an island immediately off Hokimats', having between them a very narrow passage of moderately deep water. The whole of the channel between Mats' sima and the mainland is much encumbered with reefs and obstacles, and its navigation can only be undertaken by those possessing local knowledge.

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* *See* Admiralty chart of Mats' sima to Atsusi no Osima, No. 140; scale $m = 1 \cdot 0$ inch.

Ō MURA GULF.—The approaches to Ōmura gulf from the south-westward are faced by chains of islands and rocks lying generally in a north-east and south-west direction.

OÖ SIMA.—The western and largest island, is tortuously indented on its eastern side, with numerous ledges and rocks uncovering at low water.

TERA SIMA lying close to Oö sima (the passage between being crowded with rocks) has also shores of rocky points. The channel between it and the mainland is 4 cables wide, with depths of 10 and 12 fathoms in the middle, the coast of the mainland being steep-to. There are smaller islands to the north-east of Oö sima, but a vessel proceeding by the inside route must have the chart to guide her, and be cautious in looking for rocks just awash north of Oötawa bay, which is situated on the mainland of Kiusiu.

Between Oötawa bay (where there is excellent anchorage) and the entrance to the gulf of Ō mura there are two very deep inlets ; the one immediately south of the entrance is a harbour called Kuro-kuchi-ya, having a low reef of rocks above water extending from its south shore, with deep water near its outer end.

KAKI-NO-URA SIMA, lying to the south-west, and connected at quarter ebb with Oö sima, has a deep inlet, Kaki no ura (from which it is named) ; it is, however, narrow, and only affords anchorage for small vessels. There are two bluffs on the south-east coast, which are conspicuous when seen from the southward.

Rock.—A dangerous sunken rock is said to lie about 7 cables west of Mutajima on the north shore of Kaki no ura. The anchorage is not recommended.

Mikoto sima, the western of the islands about Oö sima, and separated from the south point of Kaki-no-ura sima by a channel about one cable wide, is faced with cliffs, and can be approached to half a mile. At spring tides the race off its western point is strong.

Imo sima, a low reef, stretches to the southward of the small channel between Mikoto and Kaki-no-ura sima, having two conspicuous trees about 20 feet above high water. From the uneven nature of the bottom, there is no safe anchorage to the southward or eastward of these islands.

Kata sima, a sharp wedge-shaped island, 527 feet high, with a perpendicular cliff to southward, and a short spit extending from its north east point, lies about 1½ miles to the north-west of Oö sima.

A small rock, above water, lies three-quarters of a cable to the southward of Kata. The island is steep-to all round.

Gana she.—Three-quarters of a mile north-east from Kata sima is Gana she, a patch of rocks of about one mile in extent, having on it some isolated rocks above water.

Shira she.—A similar but smaller patch, Shira she, lies half a mile further to the north-east, the passages between having deep water. The north-eastern rock of Shira she is wedge-shaped, and about 15 feet above water, steep-to on its eastern side, but the reef extends to it westward and southward 5½ cables. Shira she lies off the entrance to Ō mura gulf at a distance of a little more than 2 miles, between which are depths of from 10 to 20 fathoms.

Directions.—The numerous islands and rocks which lie to the south-west of Ō mura gulf render the navigation near and among them difficult and dangerous; but vessels wishing to go into that gulf (which has not yet been explored), or seeking shelter from northerly, westerly, or southerly winds, will find by keeping outside them all they will be safe. In clear weather when coming from the northward, a course for the bold conspicuous bluff and trees on Matsu-yama hana (north cape of the harbour of Kuro-kuchi-ya), taking care to pass to the northward and eastward of the rock Shira she, will lead up to the entrance of the gulf; or, by closing the mainland to 3 cables and steering South, a vessel can run into Oötawa bay, remembering the rock awash (Hira she), which lies N. by W. 5½ cables, from the south point of Oötawa bay, and on which is generally a pole to mark its position.

From the southward (or northward, after rounding the south end of Imo sima), steer for a conspicuous round islet (Bakutchi) passing to the southward of it; when the channel will be open. By keeping the main shore on board, and at a distance of 2 to 2¾ cables, a vessel can pass through and round into Oötawa bay, where anchorage in 5 and 6 fathoms can be obtained. Shoal water extends some distance from the shore in Oötawa bay.

OÖ TATE, N.W. ½ N. from Ko Tate, and 9 miles S. by E. ½ E. of Sisiki saki on Hirado sima, is an island with a ridge having two hummocks near its south-east end, 257 feet high. It is 6 cables long, and N.W. by N. 8 cables from its western point are two sandstone islets above water. Deep water will be found around these islands and between them.

Caution.—A rock awash has been reported to lie half a mile N. by E. ½ E. from Oö tate. The *Sylvia's* survey failed to find it. It should however be remembered as possibly existing.

KO TATE (Bonnet), a small cone-shaped and easily distinguishable islet, with a low rock above water close to its south side, steep-to, bears

West 4¼ miles from the west point of Mikoto sima; and lies directly in the fairway between Nagasaki and Hirado sima.

YENOI SIMA, lies 3½ miles West of Oö tate. Its eastern side, which borders on the channel, has some rocks off it; but from south, round west to N.N.W. of the island, are many scattered islets, rocks, and reefs, which renders it necessary to use great caution when approaching it.

The island is 1¼ miles long, north-west and south-east, and 1$\frac{1}{10}$ miles broad, with a projecting point from the north side, close to which is an islet. The central ridge of the island rises towards the north end with two conspicuous sharp hummocks, the highest of which is smooth and 436 feet above the sea.

SARACEN REEFS.—S. ¾ W. 2½ miles from Yenoi sima is the outer or extreme rock (Hitotsuze) of extensive reefs, between which and the island's south point are several reefs and rocks, some above water, known as the Saracen reefs.

Minamize, the highest is 65 feet in height; Ogame and Funaze are each 4 feet above water, the latter being the northern rock, between which and Yenoi sima, is a clear channel nearly 8 cables wide.

Kuro sima.—W. ½ S. 2 miles from the south point of Yenoi sima is another patch of rocks and reefs, the highest of which (Kuro sima) is 120 feet above the sea. The outer danger of this reef is a patch of 4½ fathoms lying half a mile S.W. from Kuro sima.

Mize, a rock which uncovers 4 feet at low water, lies 9 cables N.E. from Kuro sima; it has no reefs off it.

Iwoze, a rock 30 feet high, lies N.W. by W. 1$\frac{6}{10}$ miles from the north-west point of Yenoi sima; it is steep-to with the exception of a patch of 3 fathoms close off its north side.

Kanagashira, a rock 64 feet in height, with several large rocks both north and south of it, lies 1$\frac{1}{10}$ miles E.N.E. from Iwoze; the smaller rocks vary from 3 to 10 feet in height.

Leading mark.—Vessels passing through the channel between Hira sima and the Saracen reefs should keep the south point of Nosaki sima in line with Tatsu saki (the north-east point of Hira sima) bearing N.W. ¾ N., which will lead westward of the reefs. Passing through to the northward, when Kuro sima rock is in line with the south extreme of Yenoi sima, haul up North. The tides set N.W. and S.E. near the reefs, and much caution is required when navigating in this locality.*

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* This leading mark passes close to a patch of 5 fathoms (doubtful), said to lie 1⅓ miles W. ⅔ S. from Mitsuze rock. Caution is therefore necessary as shoaler water may exist. The description of the Saracen reefs is principally by Captain St. John, R.N., H.M.S. *Sylvia.*

FUKU SHÉ, a dangerous rock which shows about 4 feet above water at low-water springs, and is very small and flat-topped, with deep water immediately around it, lies 4½ miles N. ⅓ W. from Ko taté and 6½ miles from the south cape of Hirado sima; and is directly in the route of vessels whether they take the outer or inner passage northward of Nagasaki. The sharp peak over Sisiki (on Hirado) in line with the Ho-agé (Sail rock) leads to the eastward, and the wedge-shaped island of Kata bearing East leads to the southward of Fuku shé.

Beacon.—A stone beacon surmounted by a hemisphere, 34 feet above high water, and coloured red and white in horizontal bands, is erected on Fuku shé rock.

Ho-age (Sail rock), a small, high rock, with precipitous sides, presenting from a distance the appearance of a boat under sail, lies N.N.W., 3 miles from Fuku shé, and may be passed on either side at a distance of one to 2 cables.

CAUTION.—As the channel westward of Yenoi sima, is bordered by many dangers navigation in these waters would be injudicious and hazardous, unless there were urgent occasion for using this channel, when great caution must be exercised. If passing through by day the south point of Nosaki sima kept in line with Tatsu saki, bearing N.W. ¾ N. leads westward of the Saracen reefs, as above mentioned. The tidal streams are very strong, and take a general north-west and south-east direction, right on to the islands and reefs; it is therefore strongly advised to keep to the eastward of Yenoi sima, the passage between which and Oö tate is safe and clear; or to the northward of Oö tate, remembering to avoid the Fuku shé.

The uneven nature of the bottom of the whole sea in the vicinities of Nagasaki, Goto islands, and Hirado, is clearly shown by the above-named sunken dangers being so isolated, and also by the singular rocks which like the Sail, Bonnet, those near Oö tate, the Tengo (Arch), and Kashé (East) rocks, have deep water immediately around them, renders it necessary that every precaution should be observed, and great care taken, when navigating this portion of the western coasts of Kiusiu, the lead giving little or no warning of the vessels proximity to danger. The tidal streams run very strong, especially in the strait.

KURO SIMA.—The southern entrance to Hirado no seto, is faced by the island of Kuro sima (2½ miles in length east and west), the southern shore of which is very bold; but from its western end, and separated by a channel of 2½ cables, is a flat rock 4 feet above high water, which, it must be remembered, would not be seen at night in calm weather; the bold bluff western end of the island is conspicuous, and is connected with the island by a low narrow neck of rocks.

TAKA SIMA, an island 1¾ miles to the north-east of Kuro sima (at the southern entrance to Hirado no seto), and between which vessels steer when taking the eastern route, is a very conspicuous landmark, having a temple near some trees cresting a square-topped hill. The southern point of the island has a sharp overhanging rock, and its southern shores are steep-to.

From the entrance to Ō-mura gulf to abreast Taka sima, the coast of the mainland has not been examined, but it takes a north-west direction, having numerous deep bays and indentations, with off-lying rocks and islets.

HIRADO SIMA, 17½ miles in length, N.E. and S.W., and (owing to its deeply indented coast-line) of an irregular breadth of from 2 cables to 5½ miles, lies adjacent to the west coast of Kiusiu, from which it is separated by Hirado no seto, commonly known to Europeans as Spex strait. Hirado is high and hilly; the principal ridges running across the island, with sloping spurs encircling the several deep bays. At the northern end, the strait is separated from the harbour of Oōsuka, on the west side by a narrow neck of land only 2¼ cables in width, whilst the head of the bay of Sisiki in the south is barely 2 cables distant from the sea on the east coast.

Yasman take, the highest hill, is 1,792 feet high, and densely wooded with fine timber to its summit.

Sira take, which crests the long smooth slopes from the North cape has a double summit, the highest being 880 feet. Here is a small temple to which the people by their frequent visits seem to attach religious importance.

Over Sisiki, the south point of the island, a sharp peak, wooded almost to the top, rises precipitously to a considerable height, and is singularly conspicuous from the southward.

The coasts of Hirado are generally bold, and from the hills being much wooded, the island is extremely picturesque.

Tsuba saki (North cape) is bold, and the north-western shores, which rise somewhat abruptly, can be approached quite close; the reefs of rocks (about 10 feet above water) off the northern point of Sisiki bay being the only danger. Several deep indentations, with bold rocky points, jut into the sea and can be rounded within a cable; the passage between Kado sima and the coast is clear and deep.

YEBUKURO NO MINATO* forms two deep bays, or rather harbours, on the western side of the north end of Hirado, and under the name of Firando, was, previous to 1623, the chief location of Portuguese, British, and other foreign trade with Japan, which from that period was restricted to the Dutch and confined to Nagasaki.

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* *See* Admiralty plan :—Yebukuro no minato, on sheet No. 139 ; scale $m=6\cdot 0$ inches.

Oösuka, the northern arm of the harbour extends in an easterly direction for 2 miles, with an average breadth of half a mile.

Hirago sima, a small wooded islet 95 feet in height, lies in the centre of the head of this arm at 4 cables from the shore; it is shoal off its north-west and south-east points.

Go-quan sima, another small wooded islet, lies half a mile W.S.W. from Hirago; in the channel between are rocky uneven depths of from 7 to 14 fathoms.

Mina sone, a reef, which uncovers 4 feet at low water, extends 1½ cables from a point near the head of the harbour on the north side, its outer edge being 2 cables north-east from Hirago sima.

Arakabu sone, a rocky patch one cable in extent, the shoalest part of which has only one foot water on it at low water, lies midway between Hirago sima (the island in the centre) and the north shore.

Kaji-kake (Rudder breaker), a dangerous rock nearly awash at low water, with deep water around, lies in mid-channel about 7 cables inside the entrance; it is small, and can be avoided by keeping the gap* in the hills over the head of the harbour open to the northward of Hirago sima, bearing E. by. S.; this leads half a cable north of the rock.

The harbour is sheltered from all winds; the depths vary from 18 to 8 fathoms with muddy bottom. A good guide to recognise its position is the small island Kado sima, lying off the north point of entrance, and 2¼ miles from Tsuba saki.

Anchorage.—Good anchorage can be found in Yebukoro no minato between Hirago sima and the head of the bay, in 12 and 13 fathoms mud bottom.

Feruyé, the second arm of Yebukuro no minato, the entrance to which is on the south shore about half a mile within the main entrance, extends south 1¾ miles, with a breadth of from 3½ to 7 cables, and is a perfectly land-locked harbour with excellent holding ground everywhere, and deep water close to its shores. Its entrance, although barely 1½ cables wide, is easy and clear, and the longest ship could from seaward boldly pass through the narrow passage, and proceed in mid-channel towards the head of the harbour, anchoring as convenient in any depth from 15 to 10 fathoms, mud bottom.

A stream flows into the head of the bay, and there are two or three small villages on its shores. The channel between Hirado and the small islets, Nakai no sima, is clear and deep, with the exception of a 6-fathom patch; by passing the islets at a distance of about 3 cables a depth of 17 fathoms will be found.

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* Trees have recently been removed south of this gap.—Lieut. J. W. Brown H.M.S. *Hornet* 1879.

There is also deep water and a fair passage to the west of the islets Nakai no sima, at 2 cables distance.

ITOYA BAY, 1½ miles deep and half a mile road, has apparently good shelter to the eastward of the island at its entrance, except with winds from N.W. to West.

SISIKI BAY is 3 miles deep, and has a general width of one mile, with gradually decreasing depths from 17 fathoms at its entrance to 12, 10, 8, and 5 fathoms. It can be easily distinguished by Oö Azika and Ko Azika sima, two remarkably bold, rocky, conical islets, having deep water all round, lying off the entrance to Sisiki bay; the whole of Oö Azika, the northern islet (530 feet high) kept well open east of Ko Azika, the southern (463 feet high) leads up the bay.

The bay is open to the N.W. and W.N.W., and the fishermen of the village state that, during the winter, heavy rollers come in; it, however, affords perfect protection from all other winds, and to any vessel well found in ground tackle, it would be a welcome haven from a heavy westerly gale, as from 5 to 4 fathoms can be obtained near the head, in the north corner, with the points almost shut in; no very heavy sea could reach this position. The holding ground (hard black sand) is said not to be very good. Ships taking the outer passage west of Hirado could put into Sisiki for the night; or, finding thick weather and southerly winds coming on, to await better weather.

SOUTH CAPE is very bold, its conspicuous feature being the singular sharp peak of Sisiki, 1,163 feet in height.

Taka sima.—Several islets and islands lie on the west side of the cape; the outer one, Taka sima, is a cone-shaped islet with deep water near, and can be rounded quite close.

Kasira sima, the northern islet, 358 feet high, lies 2½ cables from the south point of entrance to Sisiki bay.

Tide race.—A heavy tide-rip is generally to be found off South cape, extending some distance to the westward.

The EASTERN SHORE of HIRADO is clear and bold, and can be approached to within 2 or 3 cables without danger, as far as the narrowest part of Hirado no Seto (Spex strait).

The first deep bay from South cape on this shore, is Kigatsu, which, with the one immediately to the north, Ho-oki, are foul and rocky, and not recommended for anchorages; the small and snug little bay immediately off the village of Kigatsu is an exception, as anchorage in from 4 to 5 fathoms, mud bottom, can be obtained here for one or two vessels, and it is perfectly sheltered from all winds. To enter this small bay, the southern shore must be kept close on board to avoid a shelving reef of rocks on the starboard hand, which extends from the north side.

Kawatchi bay.—Four miles further north the spacious bay of Kawatchi opens, in which anchorage can be found as convenient, 7 fathoms being obtained at the head, and off the village.

Hirado.—The town of Hirado is situated on the east side of the island, and 2½ miles from the North cape. It is built on the north side of a narrow bay, on the southern shores of which the Prince of Hirado has a residence, which is enclosed towards the sea with a white wall.

Kuro ko sima, an islet 1½ cables long (N.E. and S.W.), lies off the northern entrance to Hirado bay, dividing the strait (Hirado no seto) into two channels, the eastern of which is used by vessels passing through. The bay to the southward of the town of Hirado is rocky and uneven, and subject to much chow-chow water and whirls of tidal streams.

TAS'KÉ HARBOUR.—A little over one mile south of Tsuba saki, and protected by a rocky islet (Hagé sima) is the small harbour of Taské, much resorted to by junks, but being only 2½ cables deep and 1½ cables wide scarcely affords anchorage for larger vessels. It has 4, 5, and 6 fathoms in its centre, with steep shores. There is access to this bay by both channels, formed by Hagé sima which fronts it, but the north one is the best, and carries in mid-channel 4½ fathoms A rocky patch, with a depth of 10 or 12 feet on it at low water, lies 1¾ cables East from the north point of the bay.

LIGHT.—On the north point there is a small harbour light, which, however, is but lighted occasionally.

Hirosé.—A small island 20 feet high, lies in mid-channel at the northern entrance to Hirado no seto; it is steep-to on the east side, and may be passed as close as convenient. Off its north end a bank of 4½ fathoms extends 1¾ cables to the north-eastward.

HIRADO NO SETO, or, as it is generally called, Spex strait, is now much used by steam vessels, it being safely navigable with due care and judgment.

A sailing vessel cannot, however, be taken through in safety without a commanding breeze, and which to be relied on, must be fresh and blow directly through the strait.

At its northern part, for 1¾ miles, the whole breadth of the strait is only 3 cables and the navigable channel in two places is only 1¼ cables wide.

This is the dangerous part of the strait; the great strength of the tides over the uneven bottom, especially to the westward of the Hirosé rock causes small whirlpools to form, rendering it indispensable that a ship should have good steerage way to ensure safety.

After passing the first or northern narrow part, the strait takes a circuitous round for nearly 2 miles to the next narrow passage which is formed by the western coast of Kiusiu and the projecting part of Hirado: passing this the channel opens into the spacious waters between the eastern shores of the island and the main, having at its southern end the islands of Kuro sima and the small islets of Kareki, together with the dangerous Costa Rica and Robinett rocks; while the western shore of Kiusiu has many indentions fronted by numerous islands, low reefs and rocks, the outer of which, James rock, is nearly on the route hitherto recommended and generally used.

Midzu and Mi sima.—Two islets lying about a mile north of Kuro sima, the eastern of which, called Midzu sima, has from its S.E. point, a reef extending 3 cables S.E. by E. ½ E., most of which dries at low water. The western islet (Mi sima), has from its N.W. point a reef extending W.N.W. 2 cables.

Costa Rica rock.—Coming from the southward, the first danger in the strait is the Costa Rica rock, which lies 1¼ miles S.W. by S. from south Kareki island, and nearly 3 miles N. by W. ¼ W. from Kuro sima bluff. It is small, with only 2 feet on it at low water, and has deep water immediately around it. By keeping the North Kareki island open westward of the south Kareki, bearing N.E. by E., the rock is cleared when passing to the westward of it.

The south extreme of Taka sima, a conspicuous rocky point, in line with the north extreme of Mi sima, bearing E. by S. ⅔ S., leads to the southward of the Costa Rica rock.

North and South Kareki islets, are two small islets, the southern of which is the largest, lying in mid-channel, at the southern entrance to Hirado no seto. Reefs extend a short distance from both their south points, but they are otherwise steep-to and may be safely passed at a distance of 2½ cables.

Robinett rock, three-quarters of a mile N. by E. ¾ E. of the North Kareki, is nearly awash at low water, with deep water immediately around, and the sea is seldom seen to break on it. The bold, bluff, west end of Kuro sima kept in sight half way between the Kareki islands, bearing S. ½ W., leads to the westward and southward; and the remarkable Table mountain on the east shore, open northward of the dark island under the hill, bearing East, leads to the northward of this danger.

James rock, on the eastern shore, uncovers 2 feet at low water, and is directly in the route generally taken by steam vessels; it lies N.E. ½ N.

little more than 2¼ miles from North Kareki, and 9 cables N. ⅜ W. from the westernmost island on the Kiusiu shore.

Directions.—Between the North Kareki and Oö saki (on Hirado) a distance of 7 miles, the Hirado shore should be kept on board.

Asama bank, on which is a depth of 1⅝ fathoms at low water, lies in mid-channel, 9 cables S.W. by S., southerly, from Red cliff point (the narrow part of the strait), and is composed of shingle and sand. The ebb tide sets across this bank, and by closing the eastern (Kiusiu) shore the bank is avoided.

Oötaské rock, 5 feet above high water, lies a little over 1¾ cables N. ½ W. from Nan ri Osaki (Red cliff point): a rocky patch with 15 feet on it at low water, lies three-quarters of a cable N.E. by E. ¾ E. of the Oötaske rock, with another patch of 9 feet half a cable west of it.

Kotaské, a smaller rock, drying 6 feet at low water, with shoal ground on its south-east side, lies one cable N.W. by W. ½ W. from Oötaské rock.

Vineta rock,* or rather bank, the eastern edge of which lies nearly 1½ cables S.W. ½ S. from Hirosé, contracts the channel between it and the point on the mainland of Kiusiu (Ushi-ga no kubi) to 1½ cables.

Sylvia rock, at the extremity of a shoal bank extending to the north-east from Ushi-ga no kubi, lies nearly 1½ cables S.S.E. ¼ E. from the north extreme of Hirosé, and 1¾ cables from the above-mentioned point, leaving a channel 1½ cables wide between it and Hirosé.

Tides.—It is high water, full and change, at Taske at 9h. 44m. At Oösuka, at 9h. 16m.; springs rise 8½ feet; neaps rise 5 feet.

The tidal streams at full and change run with great strength through the narrow channel at the northern part of the straits. The flood stream sets to the north parallel to the coast; the ebb to the south, with a velocity of 1½ knots at springs; in the straits the velocity varies from 2 to 5 knots.

Directions.—Entering Hirado no seto (Spex strait) from the north,† vessels of light draught use either passage, but the western, owing to its being full of rocks and having uneven bottom—with the Vineta rock to the S.W. one cable, and further subject to much "chow-chow" water and tidal whirls—is not recommended; and the eastern passage, therefore, although much narrower, is by far the safest and most easy to navigate.

The north end of Kuro-ko sima kept midway between the rock and the wooded head of Ushi-ga no kubi (a point a little more than 2 cables south of Hirosé) leads clear through the passage, passing the rock at little more than half a cable; this course will also pass nearly three-quarters of a cable outside the wooded point.

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* So named from the Prussian war steamer *Vineta* striking on it.

† *See* Admiralty plan:—Northern entrance to Hirado no seto, No. 139; scale $m = 6 \cdot 0$ inches.

Vessels of heavy draught when passing through this passage during spring tides, when the strength of the tide is great, must remember the shoal patch of 15 feet which extends 1½ cables to the north-eastward of Ushiga no kubi point. From the wooded point the Kiusiu shore should be kept at a cable's distance while rounding to Nan ri osaki (Red cliff point) where the strait is narrowed to 2¾ cables.

The precipitous fall from the end of a flat-topped ridge on the Kiusiu shore kept open of the Red cliff point, will clear the sunken rocks lying north-east of Oötaské.

The Kiusiu shore must be kept on board, distant 2 cables, until abreast Aosa saki (which is 1¾ miles S.S.W. from Red cliff point), when a course (S.W. by S.) for the extreme south end of Hirado can be shaped which will lead outside clear of all dangers.

The east coast of Hirado can be kept at from 2 to 3 cables distance.

It has hitherto been the practice to pass down the western shore of Kiusiu to the eastward of Kuro sima, &c., but from the numerous islands, rocks, and outlying dangers off that shore, and from the absence of prominent marks for avoiding the James rock, the above route is recommended; there being no danger along the Hirado east shore.

As soon as the Costa Rica rock has been passed (which may be known when Kura sima bluff bears S.S.E., with the North Kareki open of the South Kareki), a course can be shaped to pass between Mikoto sima and Ko tate; this leads a vessel 2 miles to the eastward of the Fukushé, rock beacon, taking care—should the beacon not be seen—to keep the peak of Sisiki on with or open to the eastward of Ho-age until Kata sima bears East.

Vessels taking the outer passage from Simonoseki, and passing between the Goto islands and Hirado, can round the cone-shaped islet of Taka sima (off the south end of Hirado) quite close, and to avoid the Fukushé must either take the direct route between the islands of Otate and Yenoi or steer for Ho-age, in order to run with it and Sisiki peak in line, till Kata bears East.

Anchorage.—Vessels passing through this strait will often find it convenient to anchor. The places recommended are Kawatchi, on the east side of Hirado, and Taske on the north side; or at Kamada on the Kiusiu shore, immediately north of the northern entrance to the strait.

IKUTSKI, 5½ miles long, north and south, lies close off the north-west part of Hirado sima, separated from it by the Ikutski no seto or Obree channel. Its northern points, off which is a square-topped rock, have overhanging cliffs of considerable height facing the west, with gentle slopes to the east. There are several hills on the island, the highest, being a prominent truncated cone, as seen on a south-west bearing, 929 feet above the sea. The northern part of the island is narrow, and the water deep along its coast. The south coast is bold and steep-to, and the island is here 2 miles across.

IKUTSKI NO SETO (Obree channel) is quite clear, with a depth of 11 fathoms in the middle: it is advisable to keep the Hirado coast on board when passing through, as the channel is only 2 cables wide, and the south-east point of Ikutski is low and shelving, with a 2 fathoms patch one cable off it. Anchorage inside of the south-east shore of Ikutski can be found in 7 and 8 fathoms, at about 3 cables from the village of Tatchí.

Nakai no sima.—At 1¾ miles north of the Obree channel, mid-way between the coasts of Hirado and Ikutski is a small islet, about 2 cables long N.W. and S.E. Off its north side are two small rocks above water, the northern of which (15 feet high) lies 2 cables from Nakai no sima.

DO SIMA, one mile northward of Hirado, is 2½ miles long, and only 3½ cables wide at its narrowest part; it has some rounded summits of moderate elevation, showing smooth bare rocky sides. There are smaller islands and islets with rocky ledges to the south of Do sima, extending three-quarters of a mile (with one or two sunken rocks) terminating in the small islet Yoko sima, the passage south of which, between it and Hirado, is clear of known danger. There is a prominent cone-shaped islet, Taka sima, close to Do sima, the top of the cone being the highest of the hills near.

Three rocks, two of which uncover at low water; the third, and outer, having then a depth of 6 feet on it, lie 5 cables eastward of the east point of Do sima.

There are rocks which cover at high water to the northward of the east point of Do sima; the channel between Do sima and Atsusi no Ōsima, being clear.

ATSUSI NO ŌSIMA, situated about 1¼ miles north of Do sima, is 4½ miles long east and west, and 2¼ miles broad, having two deep bays on its north-east and south-west sides; that on the south-west is the Port Lindsay, of the old charts and China Pilot. Atsusi no Ōsima, is a conspicuous object when entering the Genkai nada from the south; its highest hill, 720 feet above the sea, is situated at the northern end. The island is well cultivated to the summit of the ridges, and its coasts are bold.

Usé, a large rock, with several others near and round it, lies nearly $1\frac{3}{4}$ miles W. $\frac{1}{2}$ S. from Nagasaki, the northernmost cape of Atsusi no Ōsima, at a distance of half a mile from the shore.

Port Lindsay, on the south side of Atsusi no Ōsima, is a large bay, and but for the inconvenient depth of water would be a safe anchorage, as it is sheltered from all winds. Anchorage in 16 fathoms can be obtained at the north-east end of the bay; and light draught vesssels could anchor in the small inlet at the head in 5 fathoms, but with scarcely room to swing.

The COAST from the northern entrance to Hirado no seto, takes an E. by N. direction to Kamada, which is an excellent harbour, and is far preferable, as an anchorage, to the small and usually crowded harbour of Taské on the opposite shore of Hirado. A little further eastward is the deep bay Kubiki no ura, which would give shelter from all westerly winds. At $2\frac{3}{4}$ miles from Kubiki, is Hosika saki, the southern entrance point to Imari gulf.

Kamada bay is protected by the island of Yoko, which fronts it. It is about one mile east of Hirado strait, and can be entered by steering midway between the south-east point of the island and the opposite shore in 8 fathoms water; inside there are depths of 7 and 5 fathoms. The centre of Yoko sima is connected at low water with the main-land by a neck of sand and shingle. This anchorage may be found useful to vessels arriving at the straits at dusk, or to await a suitable time of tide for passing through.

IMARI GULF,* the outer portion of which is protected by the large island of Taka sima and Awasi sima, has three channels leading into it.

North channel is formed by the east coast of Taka sima and the main. Both shores are tortuously indented, and have from each projecting point ledges of rocks, extending but a short distance, and uncovering at low water.

The whole of the channel, as well as the spacious waters inside, almost form another harbour equal to Kariya; and excellent anchorage will be found off the village of Fuku, on the mainland, in depths of 12 and 10 fathoms, mud bottom.

Taka sima is nearly 4 miles long north and south, and $2\frac{1}{2}$ miles across its broadest part. Rocks and dangers extend nearly a mile in a westerly direction from the north cape of Taka sima, and although there is a passage of deep water between them and some rocks extending from the east point of Kuro sima, it is not advisable to take it.

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* *See* Admiralty chart:—Hirado-no seto to Simonoseki strait, No. 127; scale $m=0\cdot5$ of an inch.

Kuro sima, 715 feet high, with a cliffy face to seaward, lies one mile west of Taka sima. It has rocky ledges extending from its south, east, and north points.

FUKU SIMA, a large island inside the gulf of Imari is singularly shaped. Between its north-east coast and the main a narrow but deep passage leads to an extensive sheet of water, covered with innumerable islands and rocks, with deep water between, and at its south-east point, the rocks almost close the passage, except for boats. This portion, with a similar sheet of water and islands immediately south of Fuku sima, has not been examined. The passage between the north-west point of Fuku sima and the east point of Taka sima, is half a mile wide.

Anchorage.—There is excellent anchorage, sheltered from all winds in 5 fathoms at about one mile S. by E. from the south-west point of Fuku sima. Coal may be obtained here at $3 a ton.* Vessels entering by the north channel and proceeeding up the gulf, round the north-west point of Fuku sima, and keeping the western coast of that island on the port hand, will pass east of Tobi sima and islets which lie off the south coast of Taka sima, at distances of three-quarters and one mile; but between this group and the south coast of Taka sima there is a clear and deep passage.

South channel.—A remarkable clump of trees, on a small island, is connected with the south part of Awasi sima by a shingle beach and constructed sea-wall, and is a conspicuous object for entering Imari gulf by the south channel. This island is separated from Hosika saki of the main by a passage of 3 cables, with 13 fathoms water in the centre. There are, however, off the entrance, at 3 and 4 cables distance from the southern shore, depths of 7 and 5½ fathoms; this shore should therefore be avoided, and by keeping rather close to the north side, and near the clump of trees point, greater depths will be obtained, that point being steep-to.

The bay immediately inside the gulf and to the southward is rocky and foul for half a mile off the shore. Vessels wishing to anchor should be careful to avoid a ledge of rocks, with shoal water, which extends fully a mile from the south shore.

Middle channel, is formed by an island off the south-west cape of Taka sima and a small island 76 feet above the sea, with a single tree on its summit. This latter island lies to the north-east of Awasi sima, at a distance of 4 cables. The channel is 6½ cables wide, but a shoal extends from the single-tree islet in an E.S.E. direction for nearly 2 cables; and from the middle island shoal ground extends about the same distance in a westerly and northerly direction. The passage to the southward of the single-tree islet is encumbered by a reef near the centre, and is unsafe.

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* Navigating Sub.-Lieutenant J. Fowling, H.M.S. *Swinger*, 1874.

Kanai saki, is 5¾ miles E. by S. ¾ S. from the centre of the entrance to the south channel, and the gulf carries depths of from 29 to 18 fathoms across. To the south-west of this cape is a bay of nearly a mile in depth, where good anchorage can be found on muddy bottom.

From Kanai saki the gulf, narrowed by the southern shores of Fuku sima, runs about S. by E. 3½ miles, carrying in the middle depths varying from 17 to 10, 4 and 3 fathoms, in which latter depth it is necessary for a vessel to anchor, as the water is shallow from here to the town of Imari.

Imari, is itself situated at the head of the gulf, from which there is a navigable channel for boats, winding amid the extensive sand flats that uncover at low water, large portions of which, however, are being reclaimed from the sea by substantial walls. The town is small, but it is noted for having in its neighbourhood (at Arita), about 7 miles distant, the finest porcelain works in Japan. The population of Imari in 1875 was said to be about 4,000, but the town is not so neat and clean as Arita, which has a population of about 6,000, and is situated in a deep valley. Coal is found in the neighbourhood.

MOKO SIMA, 1½ miles north-east of Taka sima, is S.W. 5 miles from Hato saki, and shows bluff capes at each end, the higher part, 273 feet, being to the south-east. Off its northern end, as well as on the western side, a ledge of rocks uncovers at low water for 1½ cables from the shore; and off the south point there is a rock above water, with a passage between of 1½ cables width.

Rocks.—S.S.E. about three-quarters of a mile from the south point, is a large rock above water, and from the latter a rock just awash at high water, bears E.N.E. distant 5 cables. These rocks have deep water around and between them, and within Moko sima, face the north entrance to the gulf of Imari.

KARIYA, the entrance to which is 2 miles east from Moko sima, is a spacious and magnificent harbour, land-locked, without a single danger inside, the bottom being mostly composed of mud, and the depths varying from 17 fathoms at the entrance, to 12, 10, 8, and 7 inside. Its general direction is south-easterly for 1¾ miles, with an average width of three-quarters of a mile. There are several islands in the south part, as well as bays, inlets, and nooks. The village of Kariya, which gives the name to the harbour, stands on the shore of a small bay on the north shore. The whole harbour is enclosed by an amphitheatre of hills covered with wood, and is of great picturesque beauty.

Directions.—Coming from the westward, round the north end of Moko sima at a distance of not less than 3 cables, after passing which steer E. by S. ½ S. until the entrance to the harbour opens, and then for it.

From the northward the entrance will be seen opening to the right of a smooth green-topped cape (2½ miles S.S.W. from Hato saki), having a square-topped white rock in the foreground, situated 5½ cables outside the harbour. Keeping this white rock on the port hand, steer for the centre of the entrance, that has on its eastern side several large rocks, detached from, but close to the shore.

YOBUKO HARBOUR,* the entrance to which is about 4½ miles north-east of Kariya, is formed by two deep indentations in the Kiusiu coast, and is faced by Kabé (or Kata sima). Yobuko, a large fishing village, is on the eastern inlet, which is 7¼ cables deep and 1½ cables wide; whilst the western branch runs south for 1½ miles, varying in breadth from one to 2 cables, with deep water.

From the inner part of the western entrance the coast trends with rocky points and sandy beaches to the north-west for 2 miles, to Hato saki; and between this coast and the west shore of Kabé sima is the entrance to the western inlet. The eastern inlet is open to the north-east, but the outside islands in a great measure shelter the entrance, which is only 3½ cables wide. The western or southern inlet, although narrow, affords shelter, and on its western side is the large village of Nacoya. This inlet, taking a southerly direction, carries deep water for 8 cables, and then trends to the S.S.E. for half a mile, with shallow water at its head; the inlet is, however, very narrow.

Ben-ten no seto.—The projecting promontory between, the two inlets is terminated at its north end by a low flat ledge of rocks, which partly covers at high water, but has isolated red and yellow sandstone islets, with trees on them. Between the extreme point of this ledge and the southern point of Kabé sima there is a very narrow passage of half a cable wide, with 12 and 16 fathoms water in it, used by the junks when passing from one harbour to the other, and called Ben-ten no seto.

Rock.—Near the extremity of the shoal which, in the immediate neighbourhood of Ben-ten islet, extends towards Kabé sima, is a sunken rock, having less than 6 feet water on it. From the rock, Ben-ten islet bears S.W. by W. ½ W., distant one cable; and the southern or nearest point of Kata sima, N.W. ¾ W. distant 1⅓ cables. There is a depth of 18 feet within half a cable north, east, and west of the rock.

TAKA SIMA.—Off the eastern entrance to Yokuko is a steep islet covered with trees, 209 feet high.

LIGHT.—From a square lighthouse 15 feet high situated on the north end of Taka sima, at an elevation of 156 feet above the sea, is exhibited a fixed white light, visible in clear weather from a distance of 8 miles. The light shows *green* over Mé sé rock from S.E. by E. ¾ E. to S.E. by S., and *red* over Hirasé, and Oö ri sé rock, from South to S.S.W. ¼ W.

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* *See* Admiralty plan :—Yobuko harbour, No. 141; scale, $m = 4{\cdot}5$ inches.

Mé sé, a low flat rock, 20 feet above water, lies half a mile to the north-west of Taka sima. It is marked by a fishing look-out.

Hato saki, the west point of entrance to Yobuko harbour, is low and rocky, with a remarkable square clump of trees on it, which makes like an islet when first seen from the south-westward. The coast to the southward is much indented with long rocky points extending from the shore into deep water.

KABÉ SIMA, lying 3½ cables off the shore fronting Yobuko, is 1½ miles long (north and south) and one mile wide. The clump of trees on the southern end is 412 feet above the sea, and is on the highest part of the island. The village is on the south side, where numerous junks collect in bad weather, waiting to round into Karatsu bay for coals. The northern coast of the island is cliffy, black basalt; and all the shores are steep-to.

Hira sé (Passage reef) is 1½ miles N. by E. from Taka sima, and at its north and south end are rocks (on which are fishing looks-out) 20 and 30 feet above water. The reef is 3½ cables long, and the whole shows at low water, but at high water spring tides only the two rocks at its north and south end show. From its south point shoal water extends for 3 cables, with 4¾ fathoms on the end. A mid-channel course between any of the islets and reefs is safe and clear.

Oö ri sé, a dangerous sunken rock having a depth of only 3 feet on it at low water spring tides, and 3½ to 5 fathoms close round, lies 2⅝ cables N.W. ¼ W. from the northern (square-topped) rock of Hira sé.

Directions.—Yobuko harbour is easy to enter, the western entrance being bold, broad, and deep. If approaching it from the eastward, the prominent islet Taka sima is a good guide to its entrance; and by keeping a mid-channel course vessels can enter, and anchor in 14 and 12 fathoms in the centre. There is a remarkable square clump of fir trees on the low rocky point of Hato saki, which appears like an islet when seen from the westward or south-westward. The point and rocks off Hato saki at low water extend some distance out, and must be given a wide berth. The clump or tuft of trees on Kabe sima, bearing S.E. ½ E. will lead clear.

Anchorage.—After rounding the point, a mid-channel course leads up to an anchorage as convenient. A long vessel should anchor in the western inlet due south of the tuft of trees on Kabé sima, in a depth of 10 or 12 fathoms.

Tides.—It is high water, full and change, in Yobuko harbour at 9h. 16m.; springs rise 9 feet, neaps, 6½ feet.

MADARA SIMA, lying 3¾ miles to the westward of Hato saki, is 1½ miles long east and west and three-quarters north and south; it is steep-to and bold on all sides. There are two rocks above water, distant from the shore 1¾ cables, off its west and south-west points. The highest peak, is round and flat, 795 feet above the sea, and is joined by a spur to the western peak, 659 feet high, that falls steeply to the sea over a cliff-bound shore. The island is intersected by a valley, fronting which, on the south-east, is a small sandy bay and village, sheltered by a small bold promontory, which forms the south point of the island. The eastern part of the island is a smooth round hill.

All these islands have fishing villages on them. The passages between Madara sima, Mats' sima, and Iki sima are safe and clear, and carry deep water.

FUTAKAMI, situated 9 miles W. by N. from Madara sima, is a saddle-shaped island, about half a mile long and 316 feet high, with steep cliffs.

Ko Futakami, a wedged-shaped rock 176 feet high, lies W. by N. ¼ N. 1¾ miles from Futakami.

Kanatöo, lying 6 cables E.N.E. from Ko Futakami, is a small rock above water. Around these islets, and in the channels between them and Iki sima, the depths are 47 to 34 fathoms, sandy bottom.

KAGARA SIMA, is the centre and largest of three islands off the main-land of Kiusiu, immediately north of the entrance to Yobuko. It is 1¾ miles long, north and south, and three-quarters of a mile broad, and is steep-to; but 2½ cables off its south point is a rock which dries 4 feet. Oögawa clump, bearing N.E. by E. ½ E. leads clear to the southward of it.

Mats' sima lies close off the south-west part of Kagara, the passage between being 2½ cables wide, and having 5 and 7 fathoms water in it. A rock above water lies at the centre of the passage at its south end; and the south-west point of Mats' sima has rocks extending off it to a distance of 3 cables.

Anchorage may be obtained on the east coast of the island.

OÖGAWA SIMA, the eastern island of the three, is about three-quarters of a mile in extent, low, with a clump of trees on its south-east head (245 feet above the sea), a good object to steer for, in passing through the channel to the eastward of Oögawa. (There is also a high clump of trees on the south end of Kabe sima, at the entrance of Yobuko harbour, which is a conspicuous object on approach.) The passage between Oögawa and Kagara is quite clear and deep, and is one mile wide. Vessels usually take the passage south of Oögawa, which is the best.

IKI SIMA, the western island of the Genkai nada, and the largest off the north-west coast of Kiusiu, is 10 miles long north and south, and 6 miles average breadth; and lies 8½ miles north-west from Kagara sima. It is of sandstone and basaltic formation, chiefly table land, the southern part rising to an elevation of 696 feet, and its north-east hill about 500 feet. There are many islands and reefs off its shores, the deep indentations of which afford anchorage in well sheltered harbours. The western and southern coasts have been well examined, but the northern and eastern, with the bays of Moro-yosi, only partially so. Reefs, however, were seen to extend a considerable distance off the eastern coast, and shoal water in patches, was found in that vicinity and off the low islands of Na sima: still farther out are the rocky Idzumi islets only 14 feet above water.*

Go no ura, on the south-west coast of Iki sima, is a deep indentation of the shore, with depths of from 20 to 12 fathoms. Near the centre there is a rock that covers at high water, opposite to which, on the eastern shore, a ledge of rocks, partly uncovering at low water, extends 2¾ cables. There is also a dangerous ledge of rocks facing a deep inlet, near the southern entrance of the bay on the east side. This bay affords shelter from almost any wind, except from south, when a vessel would find protection by hauling into the north-east corner, from which a narrow and deep inlet winds to a large village.

The south-eastern outline of this bay is rocky, with ledges off the points, and terminated by the bluff point of Ko saki, whose summit is smooth and grassy. W. by N., ½ N. little more than one mile from Ko saki, is a rock above water.

Hira sima.—There are five islands and numerous rocks to the south-west of Go no ura, the southern of which, Hira sima, 3 miles from Iki sima, is steep-to on its south side, but very foul on its north, where a reef of rocks, above and under water, extends half a mile, to the north-west and north-east. The passages between the islands, although having deep water, are nevertheless full of rocks and uneven bottom, and should not be used.

Oö sima.—The northern island, Oö sima, has not been examined on its western side; but between its eastern point and the coast of Iki sima, a narrow channel, having only 3 fathoms in it, is used by the native craft, but cannot be recommended for shipping. The east point of this channel has a large clump of trees, which, when seen from the southward, is very conspicuous.

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* Commander E. W. Brooker, R.N., H.M.S. *Sylvia*, 1868.

Directions.—Vessels from the westward, bound for the Inland sea, and finding bad weather coming on from the north or west, will find Go no ura convenient and safe. From the westward, steer for the south point of Hira sima (the outer or southern island, which has a smooth top with black cliffy and rocky shores), giving it a berth of from 2 to 3 cables, then steer E. by N. for the next low rocky islet, giving it a berth of half a mile; when haul up N. by E. ½ E., anchoring near the head of the bay in 12 fathoms, taking care to remember the rock that covers at high water, when passing up the bay. From the eastward, before making the south coast of Iki sima, vessels must avoid the 8-feet rock which lies to the southward of the Idzumi islets, when they can steer for Ko saki (the southern cape), from which the coast should not be approached nearer than half a mile, to avoid the rock above water, and the ledges farther to the northward.

Koöze no ura, on the west side of Iki sima, is a narrow inlet of the coast, 2 miles deep, with numerous indentations, but it is not recommended as an anchorage for shipping, as the swell caused by north-east winds curves round the north end of this island, and rolls into this bay.

Yu no ura, on the north-west coast of Iki sima, is a deep bay with several islets and rocks in it, but affording shelter when inside; the navigation, however, is difficult for a stranger. The anchorage of Katsu-moto no ura, on the northern coast of Iki sima, is not recommended, as the coast is wild and rocky, and the northern islets give but little shelter from the heavy swell which rolls round the coast in north-east winds. The north coast of Iki sima can be approached to a distance of one mile.

NA SIMA.—A cluster of rocks and islets, about 1½ miles long E.N.E. and W.S.W., lies about 3 miles off the east coast of Iki sima; the southern islet is flat-topped, and 60 feet above the sea.

Idzumi islets, about 2 miles to the eastward of Na sima, consist of two low flat rocks, only 14 feet above water. Between Na sima and the Idzumi islets, the depths are uneven, and probably more dangers exist.

A rock, with only 8 feet water on it, lies at three-quarters of a mile S.S.W. from the eastern (Kami) of the Idzumi islets.

YEBOSI SIMA, is 25 miles S.W. by W. ¾ W. from Kosime no Oösima (Wilson island), and S.E. ¼ E. 4 miles from Kami Idzumi. This islet is situated in the centre of the southern portion of the Genkai nada, and is a most useful guide to avoid its dangers. It is of triangular shape, as seen from the east, but is more lumpy from north and north-west, and formed of basalt, which is extraordinarily contorted; it is 160 feet above the sea, and quite steep-to. The dangers alluded to, which exist in the eastern portion of the Genkai nada, are the Kuri no kami, Nagamo, and Noōze reefs.

LIGHT.—From a white octagonal lighthouse, 57 feet in height, situated on the summit of Yebosi sima, is exhibited, at an elevation of 182 feet above the sea, a *fixed* white light of the 2nd order, which should be visible all round the horizon, in clear weather, from a distance of 20 miles.

GENKAI NADA, is the sea comprised between Iki sima, Oro no sima, and Kosime no Oösima; and the mainland of Kiusiu. With the exception of the rock above mentioned, as lying three-quarters of a mile southward of the low flat Idzumi islets, off the eastern coast of Iki sima, the western portion of this sea is free from all dangers, the depths varying from 20 to 30 fathoms with generally a sandy bottom: coral and shells are occasionally obtained, but very little gravel.

In the eastern waters of the Genkai nada, in which a depth of 20 fathoms and under is found, there are three tidal and sunken dangers, viz., the Noōze, Nagamo, and Kuri no kami reefs, and as they are nearly awash at high water, and steep-to, great care is required in navigating in the neighbourhood during thick weather. In ordinary weather the usual route taken by steamers is easy and safe, and at night the light on Yebosi sima is a safe guide.

Tides.—The flood streams meet off Hakosaki about the centre of the Genkai nada, and the ebb separates. The velocity at springs is 1½ knots.

KARATSU NO URA, is a large indentation in the north-west coast of Kiusiu, 8 miles across between its outer points, and forming on its north-east and south-west shores two spacious bays. Between the outer points of Karatsu no ura are the small islands of Hime sima, and Kasira sima.

Shin matchi no ura.—In the eastern arm, 5½ miles deep, are two smaller bays named Shin-matchi no ura and Funa-goshi. In the latter the best anchorage is obtained in 4 and 5 fathoms.

A reef of rocks, the outer of which is nearly a mile from the shore, lies to the W.N.W. of the cape which forms the northern side of Shin-matchi no ura, and South 8½ cables from Keya saki.

In the south part of the bay are the islands of Oö, Taka sima, and Tori sima, lying immediately off the town of Karatsu, affording but little shelter to vessels during northerly winds, when a heavy swell and sea rolls in. The native craft, however, being of light draft, can obtain protection immediately south of these islands, while the greater portion enter the estuary of the Matsura gawa, which flows into the bay near the walled-in residence of the Daimio,* the fine trees surrounding the place being a conspicuous feature on the south shore of this bay. Considerable coasting trade is carried on from Karatsu by the junks, which load with coal, brought from the mines, situated on the left bank of the river, about 6 miles distance from the entrance. There are also extensive porcelain manufactories at Karatsu.

Some large sandstone boulders with sand form a barrier to the entrance of the river, and cause a deep channel on the west side, through which the tidal waters rush with great force. The depths in the bay are even and gradual, with mostly sandy bottom.

The coast of Karatsu bay is low and sandy, with rocky points, and the ranges of hills inland are extremely bold and picturesque; a prominent peak (Uki take), with a small square top rising to a height of 2,685 feet. A considerable stream winds at the foot of this ridge, between which and the Matsura gawa is a table-topped mountain, terminating about one mile from the town of Karatsu.

Hime sima, the eastern island at the entrance to Karatsu no ura, is 1¾ miles to the westward of the bluff cape of Keya saki. It is 647 feet in height, about half a mile in diameter, covered with trees, and has a yellow stripe on its north-west side. From the south point of this island, a bank of sand and gravel, which uncovers at low water, extends South 8 cables. There is a deep channel between Hime sima and the double capes of the promontory of the mainland.

Kasira sima, the western island at the entrance to Karatsu no ura, 281 feet in height, lies close to the coast of Kiusiu; the passage between is, however, shallow, and only used by junks. The island is nearly one mile long, with a low rounding spit of shingle and sand from the northern end, forming a bay with a depth of only one fathom in it. Near the centre of the island, a tall tree is conspicuous.

Taka sima, at the head of the bay off the town of Karatsu, 553 feet in height, has a square smooth top on its north side with slopes to the southward, and trees on the south-east point.

Directions.—The depths in Karatsu bay shoal evenly from 18 fathoms at the entrance to 5 fathoms sandy bottom at 1½ miles from the shore opposite the town of Karatsu; it affords, off the town, good shelter from all winds, except those from north-west to north-east, when a heavy sea rolls into the bay. The bay of Funa-goshi then offers the best shelter and vessels running for that anchorage must bear in mind the low long shingle spit which uncovers at low water, and extends 8 cables due south from Hime sima. The passage between Hime sima and Keya saki is clear in the middle, and the little rocky islet near the western point of Funa-goshi bay can be rounded at 1½ cables. The depths in that bay are from 5 to 3 fathoms and under.

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* Prince of Satou.

Anchorage.—Vessels intending to anchor in Karatsu bay can round the north side of Kasira sima at 6, and the east side of Taka sima at 3 cables; and anchor as convenient off the town. The passages westward of Taka sima are not recommended.

The COAST—Keya saki.—From Keya saki the coast trends N.E. by E. 8 miles to Hakosaki no ura, with some indentations that afford no anchorage. The ridges of hills are of moderate elevation and irregular in shape, having near Keya saki a white sandy soil mixed with red sandstone, with but few trees. The coast is sandy, with a few bold rocky projecting points. There is an islet in one bay to the south, at three-quarters of a mile from the beach.

No ö ze (Dove reef), which shows some round boulder heads, lies off the coast at a distance of 2½ miles nearly. It is 2½ cables in extent, with depths of 4½, 9, and 8 fathoms immediately around it; it may be passed at half a mile on the outside, in 18 and 20 fathoms, sandy bottom.

Nagamo (Ellis reef), lying 3 miles N.E. by N. from No ö ze, is more out of the fairway of vessels making a direct course through the Genkai nada. It bears from Yebosi sima E. ¼ N. 8 miles, and from Toö-dai (the nine-pin rock off Genkai sima) W. by N. 3¼ miles. It never quite uncovers, but in bad weather the heads of the rocks are seen. To the south-east for 2 cables, there are depths of 4 fathoms; and at three-quarters of a mile S.S.E. lies a patch of rocky ground, 4 and 4¼ fathoms being the least water on it. At a distance of 2 cables to the south-west, west, and north-west of this reef, are depths of 15 to 20 fathoms.

HAKOSAKI NO URA, about 13 miles north-east of Karatsu no ura, is a deep inlet with an easterly direction of about 10 miles, and a general width of 3 miles. The outer portion of this bay, carrying in its centre 9, 10, and 11 fathoms, is protected from all westerly winds by Genkai sima and islets in the passage between that island and the southern projecting promontory from the mainland. The entrance between Genkai and Siga sima is about 2 miles wide, and a considerable sea rolls in with northerly winds.

The eastern or inner part of the bay is effectually protected from any sea by the island of Noko no sima, which lies at right angles to the bay. The depth of water, however, in this part of the bay soon shoals after passing Noko no sima to 5 and 4 fathoms, and to 3 fathoms off the town, gradually lessening towards the head of the bay. This anchorage is not recommended for vessels over 15 feet draught. The shores of the inner bay are low and sandy, and on the south side stands the large and straggling city of Fukuoka, the capital and fortress of the Prince of Chikuzen.

Two rapid streams flow into the bay, after winding through considerable plains, under rich cultivation; the nature of the country at the back, or south of the city, is mountainous with much wood, the upper ridges and peaks attaining an elevation of from 2,000 to 3,000 feet.

Siga sima, the northern island of the bay, is 1¾ miles long and 1¼ in breadth, with a ridge of hills much wooded and irregularly shaped, having a smooth grassy sharp peak 636 feet high, near its northern end. The island is connected with the mainland (from its south-east point) by a narrow sand bank, which uncovers at low water, and joins a narrow sandy isthmus 5 miles long, which forms the north shore of Hakosaki no ura.

Rocks.—The shores of Siga sima island are rocky. W. by N. ½ N. from the north-west point, rocks awash extend 8½ cables. Caution is therefore-necessary when entering the bay.

Genkai sima, lies about 1½ miles northward of the western point of Hakosaki no ura, facing the centre of the outer portion of the bay; it is round topped and steep sided, its summit being 723 feet above the sea.

Noko no sima, in the middle of Hakosaki bay, is a long narrow wooded island, its green summit being 454 feet above the sea; between it and Siga sima there is a clear passage one mile wide, carrying 9 and 10 fathoms in the middle, but deeper towards Noko no sima than Siga sima. The western shore of this island has a prominent rock off it (Hasira sima), and generally shoal water. There is a passage to the south of Noko no sima, but there is only a depth of 3 fathoms in it at low water.

Toö-dai, a nine pin shaped rock, lies 3¾ cables W.N.W. from Genkai sima, with rocky and shoal water between, but to seaward and near, deep water. Both Genkai and Siga sima have large fishing villages on them.

Shoals.—Immediately south of Genkai sima are two smooth-topped islets, (the western one being surmounted by a solitary tree,) with bluff coasts. They are small, and have to the south-east a rock nearly always uncovered. A little to the southward of this rock, and surrounding the islets with a connection from the south point of Genkai sima, is a bank of sand, with as little as 3 fathoms near the centre of the northern passage; but the channel to the southward of the islets, between them and Nisiwura saki (on the mainland), has depths of 7, 6, and 5 fathoms, the point being steep-to.

Directions.—To enter Hakosaki bay from the southward, the points of the mainland must be kept about half a mile distant, and when the north end of Noko no sima is seen well open of Nisi-wura saki (the west point of the bay) bearing S.E. by E. ¾ E., it can be steered for, giving the cape a berth of 1½ or 2 cables.

Most vessels, however, enter the bay by the north channel, and care is then required to avoid the dangerous reef of rocks which extends 8½ cables from the north-west point of Siga sima; and also rocks above water and others awash extending 3¼ cables from the north shore of Genkai sima. Passing between the islands of Genkai and Siga, keep at from three-quarters to one mile from the former, and when the northern end of Noko no sima is well open of the southern points of Siga sima bearing S.E. by S., a vessel may haul up for Noko no sima, as she will then be clear of the Siga sima shoals.

Anchorage.—By hauling round the eastern side of Noko no sima, excellent anchorage will be found in convenient depths if seeking shelter from westerly winds; but it must be remembered that soon after passing the north end of Noko no sima, and hauling round to the south, the depths shoal rapidly.

The COAST.—From Siga sima to Chi-a saki the coast is low and sandy, and, with the exception of one small rocky point, trends in a curve N.N.E. and S.S.W., having sand hills at the back terminating southward in the north entrance to Hakosaki bay, which at low water is connected by a sand bank with the island of Siga sima. From Siga sima to Chi-a saki the coast can be approached to within half or three-quarters of a mile, except near the head of Watari bay, on the east side of Chi-a saki, when a wider berth must be given; 10 fathoms should be the least water when nearing this part of the coast.

The conspicuous feature in the mountain scenery along this coast is the sharp double-peaked hill Tatchi yama, 1,335 feet above the sea, which overlooks the head of Hakosaki bay.

Chi-a saki and Watari mura.—To the southward of Chi-a saki, a rocky ledge which partly uncovers, extends 2 cables, and gives shelter to the native craft at the head of the bay of Watari mura, from westerly winds. At the head of this bay an inlet was observed, leading into an inner harbour with numerous junks in it; and the village of Watari, from its size, indicated considerable coasting trade.

Katsuri saki.—Northward of Chi-a saki the coast is moderately low and wooded (but rocky in the immediate vicinity of Chi-a saki) as far as Katsuri saki, off which is a small red sandstone islet conspicuous from its having a single tree upon it. Beyond Katsuri saki the hills gradually increase in elevation to lofty double peaks, 1,900 and 1,978 feet in height over Kanega saki; high mountains being visible inland. Between Katsuri and Kanega saki the coast forms two bays, the northern of which is Katsu ura.

Katsu ura, is a bay on the mainland, sheltered on the north-east side by Koko sima, and the spit above mentioned. It is sheltered from all winds except those from N.W. and W.S.W.

KOKO SIMA, 600 feet high, and 1½ miles long N.W. and S.E., lies one mile off Kanega saki: from its south-east point a long gravel and boulder spit extends to the south-east for 1½ miles towards the mainland, leaving a narrow passage between. The spit is usually strongly marked by the tides, which cause heavy overfalls and breakers on it.

Anchorage.—Good anchorage may be obtained in 5 to 7 fathoms, half a mile East of the south point of Koko sima, sheltered from westerly winds by the island and spit; there is also anchorage on its west side.

Round rock, 30 feet high, lies 7½ cables north-west from Koko sima with deep water between.

KOSIME NO OÖSIMA (Wilson island), lying 5 miles off the northern coast of Kiusiu, and 2 miles W.S.W. from Koko sima, is remarkable from its prominent position off the entrance to the Inland sea; it is flat, 6 miles in circumference, and surmounted by a clump of trees, the highest part being 854 feet above the sea, and visible in clear weather 30 miles. The western side is rocky and steep-to. There is a large fishing village on its eastern shore in a small bay between two rocky points, off which rocks and foul ground extend for nearly a mile.

Serpent rock, with a depth of only 6 feet on it at low water and 6 fathoms on either side, lies immediately off the village on Wilson island, and is the outer danger of the shoal ground off this side of the island. It is nearly one mile from the north point of the island, and vessels, when running through Katsu ura, after passing Round rock, must steer for Katsu sima (which has a conspicuous round cone summit) until about one mile from it, when they will be clear of the rock and also of shoal water off the south point of Wilson island. Coming from the southward, vessels should close Katsu sima, and steer for the north part of Koko sima and Round rock.

Sunken rock.—A rock with a depth of less than 6 feet on it at low water, steep-to (6½ and 7 fathoms close around it), lies half a mile from the north-east point of the island, with Round rock bearing E by S. ¼ S. distant 1$\frac{4}{10}$ miles.

Shoal patch.—A patch of 15 feet, rock, lies E. ½ N., northerly, 3⅔ miles from the north point of Koko sima, with the outer high peak of Kiusiu (1,900 feet) bearing S. by W. ¼ W. 3¼ miles. The clump on Kosime no Oösima, kept open of the north point of Koko sima, leads northward this danger.

AI SIMA, lying 8¼ miles S.S.W. from Kosime no Oösima, is a table land 240 feet above the sea, with bluffs to seaward, on which a single tree shows conspicuously. The island is about 2 miles round, and steep-to, having a bay on the south side which would afford fair shelter to a vessel from almost all winds (the villagers who live on the island, and have their houses close to the beach, say that even in the westerly gales of winter, the bay gives good shelter); the depth, however, is great, and anchorage in 10 fathoms is close to the shore; farther out 15 fathoms. On the eastern end of the island is a hummock, which from a distance looks like an island. On the east point, and 1½ cables distant, is a remarkable arched rock of basaltic formation (Hana-guru), the passage between having depths of 6 or 8 fathoms over rocky bottom. Between Ai sima and the mainland there are no dangers, the depths towards the shore being 14 to 7 fathoms.

Kuri no kami (Swain reef), a dangerous cluster of rocks, lying in the fairway through the Genkai nada, is about 3 cables in extent, some of the rocks always showing above water: it has depths around it varying from 14 to 27 fathoms. It lies N.E. 8 miles from Nagamo and N.W. by W. ¼ W. 5 miles from Ai sima, and E.S.E. 11½ miles from Oro no sima; and is the principal danger to navigation in this locality.

ORO NO SIMA (Obree island), about 18 miles west of Kosime no Oösima, and 37 miles W. by S. from Siro sima, at the entrance to the Inland sea, is a double-topped island, the southern peak 276 feet high being the highest. The island is nearly half a mile in breadth, and elongated in a N. by W., and S. by E. direction three-quarters of a mile, its eastern side being composed of bold cliffs; a clump of trees crests the southern hill, and the village is on the south point; the inhabitants are few and wretchedly poor, apparently subsisting on fish and the barest of productions from the island. Oro no sima is quite steep-to, and can be approached on the southern and eastern sides to within half a mile; two rocks extend half a cable from its northern point.

There are no dangers between Oro no sima, Iki sima, and Wilson island, and it is believed none exist to the northward between Kotsu sima or Tsu sima, or to the entrance of the Inland sea.

KOTSU SIMA (Colnet island), lies in the Korea strait nearly midway between the east coast of Tsu sima and the western entrance of the Inland sea. In clear weather it can be seen from Iki sima, Tsu sima, and the coast. It is one mile wide at its broadest part, and its sides are steep, with a high cliff at the north-east point, rising with slight irregularities to a central peak 800 feet high. At a distance the slopes appear even.

Notch rocks.—Four notched rocks or islets, 80 feet high, and visible 12 miles, lie 4 cables S.E. by S. of the south point of Kotsu sima.

The COAST, from Kanega saki abreast Wilson island trends to the east-north-east, 8½ miles to Iwaya point, eastward of which the coast forms the southern shore of the approach to Simonoseki strait. Rocky patches exist to the eastward of Koko sima, and as this part has not been very closely examined, the navigator should therefore use great caution in approaching the coast closely between Kanega saki and Iwaya point.

Directions.—From NAGASAKI to SIMONOSEKI. —The coast route is taken by vessels who know the land, and in thick weather prefer to sight it, and feel their way along from point to point; they steer for the square rock Kashé (East rock), and pass between it and the arch rock Tengo, (or rather Hako sima, which is to the eastward of the arch rock), making for the south coast of Mats' sima, the western coast of which island is safe at 2 cables distance; taking care to avoid the rock above water off its north-west shore.

The western cape of Mikoto sima can be approached to 3 cables, and from here, in clear weather, a N.N.E. course may be shaped, passing to the westward of Kata sima, up to Taka sima, and eastward of Kuro sima; and thence along but outside (westward) of the islands which lie off the coast of Kiusiu, forming the east side of Hirado strait.

A more direct course, however, from Nagasaki harbour, is to steer straight for Ko tate (Bonnet rock), but allowance must be made for the current which in the vicinity of Oö tate, and to the southward, sets north-west and south-east; so that a vessel in thick weather, and according to the state of the tide, may be set either to the westward and northward of her reckoning, or to the eastward, and towards the main. Having sighted the cone-shaped, easily distinguished, Ko tate (Bonnet), the bold bluff of Kuro sima, can be steered for, taking care to avoid that great danger the Fukushe (marked by a red and white beacon), which lies north 4½ miles from Ko tate.

Through Hirado strait.—The inner passage from Nagasaki to the Inland sea by Hirado strait, is 15 miles less in distance than that outside Hirado, but it is seldom that a vessel is not obliged to anchor somewhere for the night.

The southern coast of Kuro sima is steep close-to, and the perpendicular cliffs at its western end loom up in thick weather. The mariner however, must remember that off its western end, and separated by a passage of 2½ cables, is a low flat rock, above water, with deep water close to it. After sighting the bluffs, vessels should steer for the south coast of Hirado, which can be boldly approached to one or 2 cables, and by keeping it in sight at 2 cables distance the Costa Rica and Robinett rocks will be avoided. Vessels can run along the east coasts of Hirado to the north as far as Kawatchi bay, when it is necessary to steer for the opposite shore, to avoid the Asama, before entering the narrow part of Hirado strait, at the Red cliff point, from which the vessel must be guided by the directions for Hirado no seto (*see* page 521).

When clear of the northern entrance of the strait, the course along the land is N.E. by E. to Hato saki, distant 17 miles, steering for the clump beyond it which is on the east bluff of Oögawa sima, the eastern of the three islands north of Hato saki and Yobuko; and passing between the bluff on the south-east point of that island and the dangers south of it (Hirase and Oöri se). The same course will lead well outside No ö ze and Nagamo reefs (which are 3 miles off shore and may both be covered), and outside but rather close to Kuri no kami (Swain reef).

Bound northward from Hirado strait, it is, however, preferable to steer from it on a N.E. ¼ E. course, to pass between Madara and Kagara, rounding the north-west point of the latter at a mile; from this a N.E. by E. ½ E. course will lead up close to the west point of Wilson island, passing half a mile to the westward of Yebosi sima, between it and the rock off the Idzumi islets.

Westward of Hirado.—Another route from Nagasaki is to steer for Oö tate, and take the clear channel between it and Yenoi sima, passing up the west coasts of Hirado and Ikutski, and enter the Genkai nada by the channel south of Iki sima. In this route, the rock south of the Idzumi islets must be remembered.

If proceeding outside Hirado, after leaving Nagasaki, steer N.W., unless wishing to pass outside Hiki sima. A run of 16 miles will place a ship abreast that island, and a further run of 13 miles on the same course will lead up in mid-channel between Oö tate and Yenoi sima, from which position a N.N.W. course for 11 miles will reach the islets off the south-west point of Hirado. Pass a mile outside these islets, and also of the Aska sima 3 miles north of them, unless intending to take the Obree channel (page 523), in which case the ship may pass between Ko Azika sima and Kasira, and steer N.E. by N. directly for it.

Coasting Hirado and Ikutski on a N.N.E. course, a run of 13½ miles from Oö Azika sima will place a vessel off the north point of Ikutski; then steer N.E. by E. for 7 miles until past Usé (the small rocky patch off the north-western face of Atsusi no Ō sima), which, if not seen, may be cleared by keeping the summit of Madara in line with the summit of Mats' sima bearing E. ½ N. Passing Usé at 1½ miles distant, alter course to E. by N. ¾ N. to pass in mid-channel between Futakami and Madara sima, from whence at night Yebosi light should be sighted in clear weather; continue on the same course, passing about one mile westward of Yebosi sima. When that island or light bears S.E., alter course to N.E. by E. ¼ E. to clear Kuri no kami (Swain reef) and pass northward of Wilson island, being careful lest the eastern tidal stream into the strait of Simonoseki, which sets rather strongly through the channels east of Wilson island, should set the vessel on to that reef. At night, by keeping Yebosi sima light bearing southward of S.W. by W. ¼ W., will lead fully 2½ miles westward of Kuri no Kami reef; and the above course (N.E. by E. ¼ E.) continued on, should lead 1¾ miles westward of Kosime no Oösima. (*See* directions for western entrance to the Inland sea, p. 443–6.)

Should the passage have been made by the Korea strait:—after rounding the north point of Iki sima, steer E. ¾ N. for the Siro simas at the entrance of the Inland sea, passing well northward of Oro no sima, with a clear run of 55 miles. The tidal streams here are not very well known.

THE WEST COAST OF NIPON.

The west coast of Nipon is not very well known, and should therefore be navigated with necessary prudence and caution. The only parts at present surveyed are the islands Sado, Awa sima, and Tabu sima, and the strait between Sado and Niëgata, by H.M. ships *Actæon* and *Dove* in 1859. The coast from Tsugar strait (page 560) to Rokko saki (cape Noto) has been partially explored by the *Bittern* and other of H.M. ships, the Russian gun vessel *Djigit*, and H.M. surveying vessel *Saracen*. The latter vessel also explored the coast between Simonoseki, the western entrance of the Inland sea, and Taka yama (cape Louisa), lat. 34° 40′ N.

The COAST* between cape Louisa and Sado is not often even sighted by European ships; its coast line, as placed on the charts, has been taken from the Japanese manuscript, and may, with the exception of possible dangers off it, be regarded as delineated with a fair amount of accuracy.

From the entrance to Simonoseki strait the coast trends to the northward as far as Tsu-no (Kado) sima, and is approached by a very even and gradually decreasing depth. The shore should be given a berth, as where surveyed or seen, it was found to be very rocky.

TSU-NO or KADO SIMA, is one mile westward of the south point of entrance to Igama bay. It is a little more than 2 miles long, E.N.E. and W.S.W., and of very peculiar formation as seen from the north, being divided nearly equally into two very flat quoins, the points of the wedges being both to the westward, and their steep falls to the east. On its north-west point is a lighthouse. The island is connected with the mainland by a shallow neck of sand, having 3 to 5 feet on it at low water, in the middle of which is a high islet (Hato sima). There is a village and pier on the south-east side of the island, but foul ground exists in that direction.

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* *See* Chart:—Korea Strait and Western Coasts of Kiusiu and Nipon, No. 358; scale, $m = 0{\cdot}15$ of an inch.

LIGHT.—From a lighthouse 100 feet in height, circular in form, and built of granite, situated on the north-west point of Tsu-no sima is exhibited, at an elevation of 142 feet above the sea, a *flashing* white light, showing a bright flash every *ten seconds* visible from seaward over an arc of 240°, or between the bearings of N. ⅓ W. and S.W. by W.; and should be visible in clear weather from a distance of 18 miles.

Shoal.—About 4¼ miles in a N.N.W. ¼ W. direction from the lighthouse is situated the tail of a bank composed of broken shells, sand, and stone, and having at this part a depth of 16 fathoms. Misaki, just open of the south-west point of Tsu no sima, marks the west extreme of this bank, which seems to be at this part not more than half a cable in width. The water deepens north, south, and west to 25 and 34 fathoms, the bottom chiefly broken shells. From the north extreme of the bank Square rock point bears E. ½ N., and south extreme of Aburatani peninsula E. by S. ¾ S. (nearly). The bank is said to trend towards Tsu-no sima lighthouse and to be connected to the point on which it stands, and there may be less water on it than is known. In the winter during north-west gales a heavy sea runs on the bank, and many junks have foundered there.

The north point of Tsu-no sima is smooth, low, slopes gently to seaward, and shows on its summit from eastward to westward a remarkable grove of trees; but from northward or southward the trees are not distinguishable.

IGAMA BAY, is an inlet extending 7 miles in an easterly direction on the south side of Natsunga saki, and immediately north of Tsu-no sima. Some islets and rocks lie half a mile off its north entrance point, which is much lower than the land of Natsunga saki, to which it is only joined by a low neck. Rocky patches also lie off the north point of Tsu-no sima, extending about the same distance from the shore; and, therefore, when entering Igama bay the centre of the channel should be kept when practicable, and the shores on either side not approached at any time within half a mile. A double-topped hill is seen on the south shore of the inlet.

ABURATANI HARBOUR,* at the north-western corner of Igama bay, affords good anchorage, sheltered from all winds, in from 5 to 10 fathoms, mud bottom, off the village af O-ura, half a mile north-west of the small islet, Ye-no sima. There is also good anchorage 1½ cables north of the islet, at the entrance to the small bight Kudzu ura.

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* *See* Admiralty plan :—Aburatani harbour, No. 457; scale m = 1·9 inches.

Igama bay gradually shoals from 20 fathoms at the entrance, to 5 and 7 fathoms at about one mile from its head.

Tenaga sima, a small islet, connected to the shore by reefs and shoal ground, divides the head of Igama bay into two bights, in the southern of which is the entrance to the large river Sumida gawa.

Funa se, a dangerous patch awash at high water, lies 4½ cables south of the shore of Aburatani peninsula. Caution is required when entering, to avoid this danger.

Tides.—It is high water, full and change, at Aburatani at 10h. 25m.; springs rise 3¾ feet, neaps 2 feet.

NATSUNGA SAKI, is the northern extremity of the western prolongation of the toe of Nipon; it is 30 miles northward of the western entrance of the Inland sea. It appears to be about 700 feet high, with a nippled outline, bordered by high cliffs on the north, and slightly tapering towards the sea, where it was about 500 feet in height. It may be easily known by the remarkable square rock or head springing from its base, and which, being entirely detached from the high land of the point gives it the appearance of an island. Seen at the distance of 24 miles from the north-east, it assumes the appearance of gently shelving tableland having three or four large notches, the sharp cone of Aoumi sima and the distant summit of Kabuto yama showing to the eastward. This sharp and remarkable cone of 700 feet elevation marks the eastern point of the deep bay of Fukugawa.

AOUMI SIMA, 4½ miles in length east and west, is 10 miles east of Natsunga saki, its western point being the sharp cone before alluded to. On the Japanese chart there is represented between this island and the coast, a finely sheltered and capacious harbour called Misumi, accessible by a broad channel from the eastward, where lie some islets; and also from the bay of Fukugawa on the west by a narrow channel between the south part of Aoumi sima and a projecting point of the coast.

Saba sima, a small island, 250 feet high, lies about 3 miles east of Aoumi sima.

Rocks.—Two sharp pointed rocks lie eastward of Saba sima, the larger bearing E. by N. about 2 miles distant from the island.

AI SIMA (Richards island).—Between Aoumi sima and Taka yama, there is a large bay with many islands in it, generally about 200 feet high and flat-topped with cliffy inaccessible sides. The largest are Ai sima and Oo sima. Ai sima, the outer, is midway between the above capes and just within the chord of the bay; it is elevated 300 feet, having a flat-topped hill in its centre.

Oo sima, 5 miles east of Ai sima, is 400 feet high, but longer and flatter. The depth is 40 fathoms, 1½ miles E.N.E. of Ai sima.

TAKA YAMA (cape Louisa), is a remarkable sharp peak 1,680 feet in height, on a projecting and very prominent point of the coast, 34 miles E. by N. ¾ N. from Natsunga saki. It has a second and lower peak on its north-east slope, and an islet off its north point. This peak appears quite isolated as seen from the vicinity of Natsunga saki.

Aston rocks.—Two rocks lie nearly 1½ miles from the shore of Taka yama (cape Louisa) which should be given a good berth in passing.

MINO SIMA, is in lat. 34° 45½′ N., long. 131° 7′ E., 24 miles W. by N. ¾ N., from Taka yama, and 20 miles distant from the northern coast of the province of Nagato which forms the foot of Nipon. Approached from the northward, at 9 miles distance it appears much extended with an undulating outline, its highest part, elevated 492 feet, being in the centre of its west side. On nearer approach, its sides appear steep and cliffy, except on the north-east where there is a sandy bay. A large square rock lies half a cable off its eastern point, and there is an islet on its north-west side.

East, 10 miles from Mino sima, soundings of 59 fathoms, sand and shells, were obtained by the *Saracen*, in 1855, from which position an even bottom was carried towards the land with very little decrease in the depths. A bank with depths of 35 to 39 fathoms on it extends about 4 miles north and north-east of the island.

MIKU URA, in latitude 35° 32′ N., affords an excellent anchorage in 9 fathoms, mud bottom; sheltered from all winds except from the East, which are of little consequence. Rocks are said to lie off the lagoon opening on the south side.

HAKI or HANGI BAY.—The anchorage off the town is bad, being open to the west, but good shelter may be found in 9 fathoms inside the North head (a smooth green head with a conspicuous tree or clump on it) to the north-east of the town, entirely land-locked. The shore between Haki and Se saki has foul ground lying off it.

OKI ISLANDS.—The Oki group, consisting of one large and a group of three smaller islands, and a number of islets and rocks, lie N.E. and S.W. of each other, and occupy an extent of 23 miles in that direction. There is an open and apparently safe channel between the large islands and the group of smaller ones.

OKI SIMA, the north-east or largest island, about 10 miles in diameter, has a number of detached high rocks close to its northern point, which is steep and cliffy. Its south-west extreme is remarkable from its terminating in a high steep bluff; its south-east point is comparatively low. The highest part of the island was estimated at 3,000 feet elevation, but no indication of a port, nor even the prospect of tolerable anchorage, was observed along its western shore.

Saigō harbour,* on the south-east side of the island, affords excellent shelter from all winds, though the water is rather deep. The entrance only 1½ cables wide is quite free from danger, and it may be boldly steered for, keeping in mid-channel. From the entrance the harbour opens into two inlets, one taking a northerly direction for 3½ miles has an average width of half a mile, with several small bays on both shores, and depths of from 20 to 14 fathoms in the centre.

The other inlet takes a westerly direction for 3 miles and is narrower than the northern. It has much more convenient depths in it for anchoring, but it is closed to all but very small vessels by shoal water which extends from the north shore west of the villages, leaving a channel only half a cable wide.

Opposite the entrance to Saigo harbour are two villages, Nishi and Higashi machi, and the mouth of the Hachi, or Yabi gawa, a small stream.

Tides.—The rise and fall of the tide is inconsiderable.

Nisi, Naka, and Chifuri sima.—A group of three islands south-west of Oki sima is about 9 miles in diameter; and probably good anchorage may be found amongst them as there are deeply indented bays. The north point of Nisi sima, the western of the three, rises to a sharp peak of 1,700 feet elevation; the other two are about half that height. They appear to be thickly populated, and the hills are cultivated to their summits. There are three or four islets lying north-eastward of them, separated by channels apparently not exceeding half a mile wide, but they appear rocky and precipitous.

WAKASA BAY.—The coast of Nipon between Tsuné saki 135° 10′ E., and Tamagawa, long. 136° 0′ E., forms a deep bight, Wakasa bay, in which are several inlets, some of which have been examined and afford safe and sheltered anchorage.

MIYADSU,* in lat. 35° 32′ N., about 10 miles southward of Tsuné saki, is a magnificent harbour, capable of affording shelter to a large number of vessels of the largest class. The harbour takes the form of an inlet 5 miles in length, with an average width of over one mile, having deep water close along its shores, which may be nearly everywhere approached to within a distance of one cable. The depths in the harbour shoal very gradually from 20 fathoms off the entrance to 8 and 10 fathoms at its head off the town of Miyadsu; the general depth over the whole harbour being 9 to 13 fathoms.

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* *See* Admiralty plan :—Saigo harbour, on sheet No. 138 ; scale $m=5 \cdot 4$ inches.

† *See* Admiralty plan:—Miyadsu and Port Ine, on sheet No. 61 ; scale $m=2 \cdot 0$ in.

The town contains about 12,000 inhabitants. Silk is manufactured in the neighbourhood, and this is a great mart for dried fish.

Kuro saki, the southern point at the entrance is the northern termination of a peninsula which projects northward for four miles, forming the eastern shore of the harbour. Mount Kuro saki, immediately over the point, is 670 feet high, and the point is steep-to.

Kata sima bana, a rocky point 1½ miles inside Kuro saki, on the same shore, has a small rock off its eastern side, but is also steep-to.

Shoal.—At 2 miles from Kata sima bana, towards the head of the harbour, on the same (eastern) shore, is a broad headland off the southern termination of which shoal water extends 1½ cables to the south-west, and skirts the shore off the village of Shishi saki. The western shore of the harbour is wooded and sandy at the foot of a range of hills of over 1,000 feet elevation. At 3 miles inside the harbour the western shore is formed by a narrow spit of sand, covered with trees, and only about half a cable wide, which extends southward for 1¼ miles towards the high land north of the town.

Inner harbour.—Behind this spit of sand is an extensive sheet of water, nearly 3 miles in length (N.E. and S.W.) with a depth of 8 fathoms over the greater part of it. The entrance to this lagoon is about 400 yards wide, but there is only a depth of 6 feet just within it. The western shore of this harbour is dotted with villages. The villages of Yegiri (at the north end of the sand spit) and Hioki bama, are also on the west shore of the main harbour.

Directions.—A mid-channel course from between Kuro saki and Nami saki (on the western shore), will lead in, clear of all danger.

Anchorage may be taken up off the town in 7 fathoms, at 2 cables from the shore, or anywhere at the head of the harbour, as convenient.

Tides.—It is high water, full and change, at 2 hrs. 5 m.; springs rise one foot.

PORT INE.—At 4½ miles north of Miyadsu is port Ine, a well-sheltered little anchorage, although the depths in it are somewhat deep. The harbour is about half a mile across in every direction, and on its eastern shore is the village of Kame sima.

Ao sima, a small island lies at the entrance to the port, and has deep water on both sides; the channel on the east side of Ao sima is, however, only little more than half a cable wide. The channel on the west side of the island is 1¾ cables wide, with a depth of 11 fathoms in it. The shores are steep to on both sides.

Anchorage, may be obtained in 10 fathoms on the western shore of the port at about 1½ cables from the shore. The water on the eastern shore is inconveniently deep.

The COAST.—The land from sea, as far as the eye can reach, is high and of a uniform appearance.

Okino sima.—The Okino islands are a good landmark; they may be passed on either side, but not between them.

The southernmost of the Okino islands bears N.E. ¾ E., distant about 8 miles from the entrance to Myadsu harbour.

SIRA SAKA, the next inlet east of Miyadsu, has a fine, deep, and safe entrance as far as at present known; it has however, not yet been surveyed but the western arm is said to be the better. Keep in mid-channel if possible on entering, and run up and anchor in any convenient depth.

OHAMA HARBOUR,* the entrance to which is in long. 135° 44½′ E. is 1¼ miles wide, and has a depth of 20 fathoms in mid-channel. The harbour is an extensive, sheltered, and convenient sheet of water in which any number of vessels may lie in safety; it is 3 miles deep and over 7 miles wide (east and west) the depths shoaling evenly towards the town, which is situated on the east shore of the bay on both sides of the mouth of a river, but the town cannot be approached within half a mile, the depth at that distance being only 3 fathoms.

Anchorage.—The best anchorage is under Matsuga saki the eastern entrance point in 11 fathoms off Katsumi ura village; or with the entrance to the river, bearing S.S.E. ¼ E. distant one mile; and the centre of the small islet Kosima (on the northern shore), bearing N.E. by N. Both the N.E. and S.W. inlets are shallow.

Tides.—The rise of tide is about one foot.

LIGHT.—A small *fixed* white light is shown from a lighthouse situated immediately inside the river, on the north shore.

TSURUGA BAY.†—This harbour, in about lat. 35° 40′ N., is very easy of ingress and egress, and, so far as is known, free from rocks; no depths of under 13 fathoms can be obtained until well in the harbour. Scattered rocks are supposed to exist well in on the western shore, which should be avoided. From the anchorage in Jogo bay the point of land forming the western entrance of the bay, and a point of land on the east side and to the northward, nearly overlap each other. During the autumn and winter months a heavy swell sets in when the wind is from the northward and westward. The land around is high, and numerous villages are situated on the eastern side of the bay.

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* *See* Admiralty plan :—Ohama harbour on sheet No. 138; scale, *m* = 2 inches.

† *See* Admiralty plan :—Tsuruga bay on sheet No. 61; scale, *m* = 1·2 inches.

The town of Tsuruga, at the head of the bay, contains about 15,000 inhabitants, and exports dried fish and rice. Good lime is made in the neighbourhood.

Directions.—Approaching Tsuruga bay from the northward, steer so as to be distant 6 miles from the north end of Tamagawa, when it is brought in line with Ibo point; then steer S.E. ½ S. until the triangular white cliff seen to the left of the town is opened, when bring it to bear S. ½ E., and then steer for it until the first prominent point on the eastern shore of the bay is brought to bear E. by N. ¾ N., when steer S. ½ W. to the anchorage.

Anchorage.—The best anchorage is in Jogo bay, north-west of the town, in 9 or 10 fathoms. There is also anchorage but less sheltered at about one-third of a mile from the shore, off the town, blue sticky mud, shelving bottom, good holding ground.

Tides.—It is high water, full and change, at 1h. 30m.; springs rise 2 feet.

LIGHT.—From a lighthouse 18 feet high, situated on Tate-ishi no hana (the western side of entrance to Tsuruga bay) is exhibited, at an elevation of 407 feet above the sea, a *fixed* white light, visible seaward through an arc of 259° between the bearings of N. 65° E. and N. 36° W., and should be seen in clear weather from a distance of about 20 miles.

WURASUGA BAY,* an inlet 1¼ miles long, by about 2 cables wide, indents the western shore of Tsuruga bay, in a north-west direction at about 2 miles south-east of Tate-ishi no hana lighthouse. The water is moderately deep in the bay, and anchorage for small vessels may be obtained, perfectly sheltered from all winds.

MIKUNI ROADS.†—The approach to Mikuni roads, in about lat. 36° 13′ N., long. 136° 8½′ E., is bold to within half a mile from the shore, when the soundings vary from 9 to 6 fathoms.

The town of Mikuni is said to contain 10,000 inhabitants; it exports silk and dried fish. It is situated on the right bank of the Mukuni river about half a mile from its mouth; the bar of the river has only a depth of 6 feet on it at low water.

There is apparently deep water off the west side of Ajima, and it can be passed at three-quarters of a mile.

Anchorage.—The anchorage in the outer roads is exposed from S.W. round west to North, but completely sheltered from all other winds.

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* *See* Admiralty plan:—Wurasuga bay, on No. 61; scale $m = 1{\cdot}25$ inches.

† *See* Admiralty plan:—Mikuni bay, on sheet No. 61; scale, $m = 1{\cdot}9$ inches.

Rocks are said to exist inside of Ajima to the northward of the anchorage: give this island a berth of about half a mile, and haul up for the entrance of the river when the mouth bears E.S.E.

Bring the west end of Ajima to bear North, then steer North or South as the case may be, until the mouth of the river (which is easily distinguished) bears E.S.E., when 7 fathoms will be found, sand and hard mud bottom, good holding ground. Thence a course E.S.E. leads up to the entrance, and, as the depths decrease gradually, suitable water may be found for anchoring in.

Anchor in 6 fathoms with the centre of Ajima bearing North, and the bar to the river distant three-quarters of a mile, and borrow a little on the southern shore.

Tides.—Rise and fall of tide about 2 feet.

The COAST, from Mikuni trending to the N.E., North, and E.N.E. for 100 miles as far as Shui siu saki, has not been examined, and there are no known anchorages along it.

ROKKO SAKI (cape NOTO), in lat. 37° 28′ N., is the extreme northern point of the large peninsula of Noto, which projects northwards for 50 miles, and has an average width of 15 miles; it is elevated about 700 or 800 feet, the land rising 1,200 to 2,000 feet to the westward of it. At 12 miles W. by S. from the cape is a remarkable white cliff that shows well to the westward; from this cliff the coast bends in to the southward and forms Waisima bay. The opposite point of the bay is about 8 miles distant, and immediately above it is the sharp peak of Wasisu yama, elevated 2,000 feet, which is the highest point in the neighbourhood, the land being generally level and of an uniform height of about 800 or 1,000 feet. At 10 miles W. by S. from Waisima, or 30 miles W. by S. from cape Noto, the coast at Isonosu, a prominent projecting hill, 800 feet high, trends away sharply to the southward. Soundings of 70 fathoms were obtained at 10 miles West of Isonosu, deepening to 232 fathoms at 25 miles south-west.

LIGHT.—From a white stone lighthouse situated on Rokko saki, at an elevation of 152 feet above the sea, is exhibited a *fixed* white light of the 2nd order, visible between E. by S. and N.W. ¼ N.; and should be seen in clear weather from a distance of 18 miles.

Hime sima reef, consists of five rocks, the south-western (Isono shima) lying E. by N. nearly 5 cables from Ai saki. From Isono shima the reef extends about 3 cables in a north-east direction, and is about one cable wide at its broadest part. Part of the reef is awash and part above water.

There are depths of 4¼ and 5 fathoms between Isono shima and Ai saki; but vessels are cautioned against using this passage as there is much uneven ground in the vicinity, and it is reported that a 5-fathoms patch lies at a distance of 3 miles from Shiu siu saki.

A sunken ledge of rocks, with only 3 feet water on it, is said to lie between the Astrolabe rocks and Waisima, 2½ miles from the latter place.

AROOSTOOK REEF.[*] — A dangerous reef lies nearly N.N.W. ¾ W., 10 miles from Rokko saki. From the reef the northern Astrolabe rock bears W. ¾ S., and Isonosu hill S.W. ½ W.

YUTSI SIMA, in lat. 37° 50½′ N., long. 136° 55′ E., is 40 feet high, about two thirds of a mile in diameter, level, and cultivated; there are a few stunted trees on it, and a small village on its southern side. With the island bearing N.N.W. distant 5 miles, the depth was 46 fathoms, fine sand, and the soundings regular both on approaching and leaving it.

NANA SIMA (Astrolabe rocks), in lat. 37° 35′ N., long. 136° 54′ E., is 200 feet high, about a quarter or a third of a mile in diameter, and is the largest and highest of a group of five rocks, which extend nearly 1½ miles in a N.E. and S.W. direction, and vary from 200 to 70 feet in height.

NANAO HARBOURS,[†] are formed by a large bight which indents the coast in a westerly direction for some 10 miles, and is divided into two inlets by the large island Noto jima (Sima-no-chi) which, lying east and west, within the points of the bight, is only separated from the mainland at the head of the bight by a channel about 3 cables wide, in which there are several islets and rocks. The inlets are known as North and South harbours.

North harbour, is easy of access and affords excellent shelter in either of the inner bights, in its north-west corner; in the eastern, off the village of Nakai, and in the western off the village of Anamidz. The entrance, known as the Great Entrance, is about 1¼ miles wide, with depths of from 20 to 30 fathoms in mid-channel, but a bank of 6 to 9 fathoms lies immediately outside it. Within the entrance the harbour opens out, forming a spacious inlet clear of dangers.

The South harbour, the entrance to which is known as the Little Entrance, is about 4 miles south of the northern entrance, and is much encumbered with reefs.

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[*] Discovered by U.S.S. *Aroostook*. Another reef has been reported by a master of a merchant vessel as lying 6 miles W.N.W. from the above position.

[†] *See* Admiralty plan :—Nanao harbours, No. 205; scale m = 1·75 inches.

The entrance is from half to three-quarters of a mile wide; its navigable channel is, however, much contracted by several rocky shoals, with deep water between them, and great care is necessary when entering. After passing the projecting point and reefs which form the narrow entrance, a wide and capacious bay opens, but it is so filled with rocks and shoals that the northern bay should always be used in preference by a vessel seeking temporary anchorage.

The city of Nanao is situated in the extreme southern angle of the bay, and in the main channel the soundings gradually decrease from 14 fathoms at the entrance until the anchorage off the town is reached. The population of Nanao is about 15,000, and it exports very little, if anything—a few dried fish and mats only.

A ship-yard is being built to the eastward of the town.

Ojima and Mejima.—Two small islands, the former 3 feet and the latter 9 feet above water, lie at the head of the harbour about 2 miles from the town. There is deep water to the eastward of these islands, but W.N.W. from the western one, a shelf with only 16 feet water on it extends 5¼ cables in that direction, and 4 cables south-west from Ojima. By keeping the starboard hand on board on entering, and passing about a quarter of a mile from the only bluff point on the western side as the harbour is entered, the water will shoal gradually from 7 to 4 fathoms, muddy bottom.

Rocky bank.—In the outer part of the entrance, and in mid-channel is a rocky bank of from 3 to 6 fathoms, outside which in 9 fathoms, a vessel can temporarily anchor to obtain a pilot; should she proceed without one, a boat should be sent ahead to sound.

Miyose rock.—A sunken rock, on which there is only a depth of 2 feet, lying north of the centre of the channel, is the principal danger, and this must be left on the port hand on entering; a mark for clearing it (if the mark can be made out) is the north side of Nanatsu-jima, in line with a low point (Hadinga sima saki) under Channel bluff bearing W. ¾ S.

Two reefs, each one cable long, and with 6 feet water on them, are said to lie 5 miles east of the entrance; therefore the harbour should be made from E.N.E.

There are no peculiar features of the coast, or landmarks, to denote these entrances, as they are approached from the seaward. They may, however, be readily seen by their open space, which is easily discernible from almost any position. The coast for two miles off appears clear and free from rocks, so far as is known. A sunken rock exists about 5 miles from the southern point, and a reef is said to exist off the northern point of south entrance.

The depths decrease gradually from 54 fathoms, 20 miles off, until near the land. The best course for standing in either entrance is mid-channel.

Directions.—The following directions for the southern entrance to Nanao harbour are by Commodore Goldsborough, United States Navy:—

"Bring the middle of the entrance to bear W. by S. $\frac{3}{4}$ S., and then run for it. After entering the channel, keep close over to the north shore, running parallel to a line passing through Channel bluff and Matsu saki which will be a course about W. by S. $\frac{3}{4}$ S.; but do not get inside the bight between the two points, for there is a shoal there with only 3 feet of water on it bearing S. by W. from a small village. In passing through the channel south of Channel bluff, between Fairway bank and Fukura, saki, borrow on the northern side, which may be approached quite closely, and steer in towards the harbour S.W. by W. $\frac{3}{4}$ W.

"The southern side of the entrance of Nanao is said to be rocky, with dangerous reefs extending from it in an easterly direction to the distance of 5 miles.

"From Channel bluff steer S.W. by W. $\frac{1}{4}$ W. until north of side square cliff (Ota) is in line with east end of Mejima; then steer S.W. $\frac{3}{4}$ W. until north end of square cliff is in line with centre of Ojima, when steer S. $\frac{1}{2}$ E. until centre of Ota bears E. $\frac{1}{2}$ N., where a good anchorage will be found in 4$\frac{1}{2}$ fathoms water, in about the centre of the harbour.

"The danger to be avoided in entering this harbour is a 16-foot spot (Ojima shelf) which is 850 yards from Ojima, and in line with that island and the north end of Ota cliff."

Tides.—It is high water, full and change, at 2 h. 50 m., but the rise of the tide is very insignificant, reaching only 16 inches at spring tides.

TOYAMA BAY.—The coast to the south-west of Yahiko yama is very high, especially near this bay, where the three snowy peaks of the Sa yama mountains appear above the clouds. Shiusiu saki is the western point of entrance to this extensive bay, which is broadly open to the north and north-east. The *Djigit* passed along its eastern and southern shores both of which are very populous, as was evident in the number and extent of the villages seen.

Some rivers flow into the bay, but having bars like that of Niëgata they are not accessible to ships. All the anchorages off the villages are more or less exposed to winds from the northward. The Gensiu gawa, on which the town of Toyama stands, has a bar of 7 feet water completely across it.

This bay is in every respect inferior to the roadstead of Niëgata, and with strong northerly winds more difficult to quit.

Fushiki anchorage.[*]—On the western shore of the entrance to the Imizu gawa stands the town of Fushiki, off which there is anchorage (with off shore winds) in 6 fathoms on a bank which extends about one mile from the shore. Vessels should not anchor with the lighthouse bearing westward of S.W. as the bank is very steep-to.

LIGHT.—From a white hexagonal lighthouse, 38 feet high, situated on the north-west side of the river entrance near Fushiki (Honotsu), 38 feet above the sea, is exhibited a *fixed* white light visible in clear weather from a distance of 10 miles.

Anchorage.—Good anchorage, with off-shore winds, will be found in 5 fathoms with the lighthouse bearing S.S.W. ¾ W., distant about three-quarters of a mile.

The COAST, from Toyama bay to Niegata, a distance of 120 miles takes a general N.E. direction ; it has not yet been surveyed, and no known anchorages exist along its whole extent.

Yahiko yama.—At 15 miles S.W. ¼ W. from Niegata, the low shore terminates at Kadota yama head, 4¼ miles north of a spur of the fine peaks of Yahiko yama, which has the appearance of a blunt cone sloping on the west. A mile to the south, the peak of Kauriko yama rises to a higher elevation.

PORT NIEGATA.[†]—The city of Niegata in lat. 37° 56′ N., stands on the left bank of, for Japan, a rather large river, (Shinano gawa) with 4 fathoms water within the entrance; but a bar off the entrance closes it to vessels of greater draught than 7 or 8 feet.[‡] In fresh breezes from seaward the sea breaks across the entrance, and at that time not even a boat could cross the bar without risk. The roadstead off the river's mouth is quite exposed, and the holding ground bad.

Niegata, one of the ports open by treaty to foreign trade, is the most opulent city on the west coast of Nipon, and appears to absorb nearly the whole junk trade of that side of the island. It is said to be more than four times as large as Hakodate, and the population exceeds that comparison. A small battery near the entrance to the river appears to be unarmed.

The city, which is of great extent, is intersected by canals crossed by bridges, their banks shaded by weeping willows. It is surrounded by gardens of the pear tree, peach, and vine; between the trees are planted turnips, onions, and mustard.

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[*] *See* Admiralty plan :—Fushiki anchorage on sheet No. 61 ; scale, *m* = 1·25 inches, shortly to be published.

[†] *See* Admiralty plan :—Port Niegata, on sheet No. 536 ; scale, *m* = 2·8 inches.

[‡] Improvements are reported as about to be carried out at this port. Two channels 600 feet in length and 21 feet in width are to be constructed, stretching from the mouth of the harbour, in which there is to be a depth of 18 feet at low water.

Niegata is situated on an extensive alluvial plain, intersected by many rivers, which fall, near the coast, into the main stream, the Sinano gawa, which takes its rise about 120 miles to the southward. This low coast extends for 42 miles, and presents an even appearance, dotted with trees and houses. When bearing South or S.S.W. it is seen clearly intersected by the river entrance, filled with junks; from other directions their mastheads are visible over the land, one fleet of them lying just within the entrance, and another more to the southward, off the city. Farther to the east, on a small elevation, is seen the town of Aosima yama; and high mountains rise in the interior.

Soundings reach to a considerable distance off the mainland in the vicinity of Niegata; vessels, therefore, running between Sado and Nipon at night, or in a fog, should keep the lead quickly hove. Should soundings be obtained and decrease gradually, the mainland is being approached. A run of very deep water will be found on the Sado side of the channel.

To the northward of Niëgata the soundings decrease more gradually. In 27 fathoms the water changed to light green, and decreased to 7 fathoms at 3 miles from Niegata, or half a mile from the bar, over a bottom of black sand, the water being slightly fresh.

The bar of the Shinano gawa when examined in May 1859 by the officers of the Russian gun-vessel *Djigit*,* was found to be a sand-bank at about a mile from the land, carrying only 6 feet water, with no channel. The depth increased beyond this obstruction. In October, the edge of this bank was scarcely half a mile from the coast, with a small passage over the bar carrying 8 feet at high water, close to the north-west of the west point of entrance.†

The breadth of the embouchere is about 3 cables, the depth at the right bank being 10 feet, and at the left, where some junks were anchored, 6 and 7 feet. The current of the river ran 2½ knots.

The left bank of the river from its mouth is sandy, and first turns S.S.W. and then S.W. up to the city. The right bank is sandy at the entrance, then marshy, but steep; it trends S.E. by S., and then runs parallel to the left bank. The broadest part of the river is 6 cables, opposite the second bend. At this place, on the right bank, it is joined by the waters of the Agano gawa and another stream, which unite in disemboguing. On the east the Shinano gawa receives the waters of another river, which flows into it in a stream of considerable width between rice fields.

There are two shoals in the centre of the Sinano gawa, with a channel between them carrying 7 feet, and increasing to 12 feet near Niegata. The second shoal from the mouth is covered with reeds. A clear channel, carrying 4 fathoms over sandy bottom, runs close along the right bank.

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* The description that follows is from the officer commanding the *Djigit.*

† In 1867 there were two boat channels, the eastern being the deepest, carrying 8 feet at low water.

Anchorage.—Although Niegata is opened to European trade, no vessel except a powerful steamer could, during the autumn or winter months, remain at anchor off that port, as gales of wind commencing at S.W. and veering to N.W. rapidly succeed each other, sending in such a heavy sea that no ground tackle could be depended on. Under these circumstances, the most prudent course to adopt is to anchor under shelter of Sado, and wait a favourable opportunity for communicating with Niegata.

LIGHT.—On the west side of the river at port Niegata is situated a hexagonal lighthouse painted black, from which at an elevation of 69 feet above high water, is exhibited a *fixed white* light, which should be visible in clear weather from a distance of 9 miles.*

Supplies of all kinds may be obtained at Niegata, with the exception of water.

Tides.—For the distance of 4 miles a strong indraught, on the flood tide, is experienced off Niegata, greatly to the inconvenience of sailing vessels seeking an offing. The ebb would assist them off the land. It is high water, full and change, at Niegata at 3 h. 10 m.; springs rise 1½ feet.

The town of Aosima yama stands near the embouchure of a river, which also has a clear channel carrying only 7 feet. It is said to be 6 miles N.E. of Niegata, but is but half that distance according to the Japanese manuscript.

SADO ISLAND,† lying 25 miles westward of the important trading port of Niegata, is 33½ miles long, N.N.E. and S.S.W., nearly 17 at its widest part, and is composed of two parallel mountain ranges lying N.W. and S.E. of each other, the neck of land joining them being a plain, on the N.E. and S.W. sides of which are formed two extensive open bays. A remarkable sharp conical hill, 700 feet high, stands on a flat off the north extreme of the island, and from a distance looks like an isolated rock. To the northward of this are a few detached rocks close to the shore, and one off Hadiki saki, the north-eastern point of the island.

This latter point rises somewhat abruptly and attains an elevation of 3,800 feet, from which the land, descending slightly, runs in rocky ridges to the south-south-west for 10 miles, and terminates in a sharp nipple of 4,500 feet elevation, whence it descends in a gentle uniform slope to the southward. These ranges rise abruptly from the shore on both sides, which are generally cliffy and steep-to, a berth of three-quarters of a mile clearing all known danger.

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* The best landing place for boats is near the lighthouse. The bar is often dangerous and a steer oar should be used, going in, with the lighthouse bearing S.E. ½ S. and rounding it when close to the beach. The light is reported as not to be always depended on.

† *See* Admiralty plan:—Sado island and approaches to Niegata, No. 536; scale $m=0 \cdot 2$ of an inch.

Sawa umi.—The west point of the island has a bold, clear shore, whence the coast recedes round Sawa-umi bay to the south-east, and is low. There are numerous fishing villages along the western shores, and a few boat harbours were seen. The shores in the environs of Sawa-umi bay are well peopled, and the land well cultivated, but it is not so populous nor so fertile as the eastern portion of the island, on the southern part of which an extensive undulating plain, stretching from the base of the hills to the sea-shore, offers a more profitable return to the husbandman. Sawa-umi bay has not (1882) yet been surveyed.*

Minato mats, formed by a bend in the coast on the north-east side of the island is an extensive bay affording anchorage in 12 to 16 fathoms, sheltered from E. by S. (through south and west) to North. At the head of the bay is the town of Yebisu at the west end of which a small light is exhibited. Behind the town is a lake 3 miles long and one mile broad, having an outlet to the sea.

Okawa point.—A conspicuous rock, 60 feet high (Siza), lies off Okawa point, the south extreme of the bay.

Supplies are not plentiful at Minato mats, but fresh beef (bullocks) may be obtained.

Tides.—It is high water, full and change at Yebisu, at 5h. 0m.; springs rise 2 feet.

Oda bay.—Anchorage will also be found off Oda village, a quarter of a mile S.S.W. of Matsuga saki, a low projecting tongue of shingle, bearing S.S.W. ½ W. distant 10½ miles from Okawa point. The *Actæon* rode out a heavy gale of wind here in 13 fathoms water. This anchorage, however, is not recommended as the water is deep, and it is very open.

The south part of the east coast of Sado possesses several coves and inlets in which small craft will find excellent shelter, but there is no harbour of importance on it.

Ogi bay † is a small indentation on the south-east side of Sawa saki (south-west point of Sado island) about half a mile deep (north and scuth) and about 2 cables wide; but is very shallow at its head, is open to southerly winds, and affords anchorage only for small craft. At its head is the village of Ogi. Rocks extend 1½ cables from its eastern point of entrance, and numerous reefs extend half a mile from the shore to the eastward of the bay.

Supplies.—A few fowls, some fish, and vegetables, and occasionally bullocks, may be obtained at Sado. Small Japanese ponies and a few cattle are on the island. The brushwood, especially in the south-west part of the island, swarms with pheasants, and a few hares have been seen.

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* The west coast of Sado island has not been closely surveyed; it has been placed on the charts from a Japanese map.

† *See* Admiralty plan:—Ogi bay on sheet No. 536; scale, $m=2\cdot 9$ inches.

Firewood may be obtained, but it is supposed not in sufficient quantities for steaming purposes. Nearly every little valley has its stream of excellent water flowing down to the beach, and when the sea is smooth easily obtainable. Coal is not known.

OGA SIMA PENINSULA.—The coast of Nipon northward from Niegata as far as cape Yokoiso (*see* page 560), a distance of 180 miles, takes a general N.N.E. direction as far as Oga sima peninsula in about lat. 40° N., whence it trends due North to cape Yokoiso. Anchorage may be obtained with off-shore winds, at Kamo * and Sakata,* the former in lat. 38° 47′ N. and the latter about 11 miles farther northward, and it is probable that shelter may be obtained on either side of Oga sima peninsula, according to the direction of the wind.

AWA SIMA, a narrow island, the north-east extreme of which is in lat. 38° 29′ 36″ N., lies N.N.E. and S.S.W., about 10 miles from the coast of Nipon, and reaching at its southern extreme an elevation of 680 feet. It is 3⅛ miles in length, and nearly a mile in breadth, the widest part being in the centre, where, on the east shore, is a fishing village; while another stands at the south end of the other shore, in a small bay protected by a natural breakwater.

The south-east side of the island is fringed with a narrow bank of soundings, but is clear of rocks, with the exception of one, which show at all times, and is only one cable from the beach. The remainder of the island is bordered by reefs and rocks, but they do not extend beyond a quarter of a mile from the shore, except at nearly a mile N.N.W. of the north point of the island, where is a dangerous rock on which the sea sometimes breaks.

There are 10 fathoms quite alongside the rocks on the north-west side of this island, and 50 fathoms a very short distance outside. Off the north-east point for about 2 miles, soundings on a rocky foul bottom may be obtained, but vessels should rather anchor on the narrow belt of soundings on the south-east side. Nothing in the way of supplies excepting fish can be obtained.

TABU SIMA is a small island, in shape somewhat of a horseshoe, with a club at its north-east end, lying 45 miles N.N.E. from Awa sima, at about 12 miles from the mainland of Nipon. It is nearly flat on top, varying from 120 to 150 feet in height, and is 1½ miles long N.E. and S.W.; its widest part (the north-east end) being not quite a mile across. No supplies could be obtained except a few fish. Springs of excellent water abound.

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* *See* Admiralty plans :—Kamo and Sakata harbours on chart No. 536.

Tabu sima is covered with a thick vegetation and bordered by cliffs and steep banks, the latter occasionally margined by small beaches, affording space for several fishing villages, the inhabitants of which send large quantities of dried squid to the mainland. Soundings of 9 fathoms were obtained at nearly a mile off the north-east point of the island, but the lead affords no warning on any other side, as it and the detached rocks are quite steep-to.

Anchorage.—The *Actæon* anchored in 25 fathoms off the bay on the south-east side, with the south extreme of the island bearing S.W. by W. ½ W., and Observatory rock N.N.E. The Russian gun-vessel *Djigit* anchored in the same bay in 9 fathoms over a coral bottom. It affords shelter from all winds prevalent in the Japan sea.

Except on the south-east side, the island is surrounded by detached rocks; they all show, and are in no instance more than three-quarters of a mile off shore. Some rocks off the west side are remarkable, the largest being higher than the island; these are all inaccessible, but the southern of them is on an extensive flat reef. Those on the north-west are small and low.

BITTERN ROCKS.—This group of three small rocks, two above water and one awash, was discovered by H.M.S. *Bittern*, 8th July 1855. Commander Vansittart, who landed on the largest rock, writes*:—" They " are grouped together, within the space of 2 cables, steep-to on their " western side, having 15 and 17 fathoms at the distance of 2 cables, " and no bottom with 140 fathoms at 1½ miles. The face of the rocks was " found covered with seals, which were with difficulty dislodged, the larger " ones barking and snarling in a vicious manner, and carrying off musket " balls from within ten yards distance without any apparent inconvenience."

The south-western or largest rock, situated in lat. 40° 31′ N., long. 139° 31′ E.,† is about 12 feet high. The smaller rock, lying rather more than a cable E.N.E. from the larger one, is about 6 feet high, and broken water extends from it about a third of a cable to the northward. The third rock, awash, lies to the S.E. of these two, forming nearly an equilateral triangle with them.

Currents on WEST COAST of JAPAN.—The sea on the west coast of Japan and in Tsugar strait, retains its high temperature two months longer than on the east coast. During the winter months the sea level is lower than in summer, which may be accounted for by the constant north-west gales which occur during that season of the year. Off Kado (Tsu no) sima the current sets to the northward in the summer with considerable velocity forming, at a short distance off shore, heavy tide rips in summer, and a very rough sea in bad weather. From Kado sima the current sets to the north-east towards Taka yama (cape Louisa) and may be felt at 2 miles off shore, its track being distinctly marked by tide-rips where it comes in contact with the tidal streams, which near Aston rocks in Haki bay, and between the neighbouring islands, are regular in their movements during fine weather.

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* Remark Book. H.M.S. *Bittern*, 1855.

† From a running Survey made by Mr. J. Richards, Master Commanding H.M.S. *Saracen*, in 1855; the rock, when in line with cape Yokoiso (Gamaley) bore N. 76° E. (*true*).

From Taka yama to Hino misaki the current retains its north-easterly direction at some distance from the coast, and the tidal streams in shore are weak. From Hino misaki to the Oki islands the current sets to the eastward and is much accelerated in force by a south-west wind; it retains its easterly direction about as far as Yutsi sima, and vessels steering south-west from that island are invariably set towards the shore. The tidal streams inshore are variable in strength, the flood setting to the westward, and the ebb to the eastward, the latter stream being much the stronger.

Off Rokko saki (cape Noto) the current sets strongly inside the off-lying reefs, but close to the land there is a counter current, and caution is necessary when navigating in this locality. In Toyama bay the tidal streams are regular, but only change once in 12 hours.

Between Sado island and the mainland, and northwards towards Awa sima, the current sets mostly to the northward; but with strong north-east winds its direction is changed. Inshore of a line joining Awa sima and Tabu sima the current is not felt, but outside that line it flows in a N.N.E. direction, increasing in strength as the Bittern rocks are approached, whence it flows north-east, setting into and through Tsugar strait with great velocity. (*See* page 6.)

CHAPTER VIII.

JAPAN ISLANDS.—TSUGAR STRAIT, NORTH COAST OF NIPON, YEZO ISLAND; SAGHALIN AND KURIL ISLANDS.

VARIATION { Yezo and Saghalin, 2½° W., to 5¾° W.
Kuril islands, 2° W. to 2° E. } in 1884.

TSŬGAR STRAIT.

TSUGAR (TSUGURU) STRAIT,* separating Nipon from Yezo island, is about 40 miles in length in an E.N.E. and W.S.W. direction, and 9½ miles wide at its narrowest part.

Current.—The current sets strong to the eastward through Tsugar strait. As a general rule, a west going stream was found close to the shore, between Siriya saki and Toriwi saki; also in the bay immediately west of Yesan, and between Suwokubi and Hakodate head. Vessels steaming should, when bound westward from Hakodate, keep well inshore along the Yezo coast to avoid as much as possible the strong north-east current. (*See* page 27.)

NORTH COAST of NIPON.—CAPE YOKOISO (cape Gamaley).—Approaching the western entrance of Tsugar strait from the south-west, the Bittern rocks will be seen (when in line with cape Yokoiso, bearing E. by N.) The land about this cape is moderately elevated and level. The coast between it and Oho saki, to the northward, is low and sandy. Sasagota bay (of Krusenstern's chart), at 6 miles southward of Oho saki, appears to be nothing more than a large shallow lagoon; its entrance is narrow and barred across, with only sufficient depth to admit junks at high water. Between the bay and Oho saki the coast is safe of approach, having regular soundings, and affording fair anchorage in N.E. winds.

OHO SAKI (cape Greig) is remarkable from its peculiar form, and being the commencement of the high land extending to Tatsupi saki, which bears from it N.N.E. ¾ E. 8½ miles distant. The bay between these points, although containing much foul ground, may be useful to a vessel not able to get though the strait during an easterly gale.

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* *See* Admiralty chart:—Strait of Tsugar, No. 2,441; scale $m = 0·3$ of an inch. The description of this coast is principally from the remarks of Mr. John Richards, Master Commanding H.M. Surveying Vessel *Saracen*, who surveyed this strait in 1855, and Lieut. R. Hoskyn, H.M.S. *Sylvia*, 1882.

Anchorage.—The best anchorage is in 12 fathoms, at three-quarters of a mile off shore, and at one-third the distance from Oho saki to Tatsupi saki. The bottom of the bay is very foul.

TATSUPI SAKI, the south point of western entrance to Tsugar strait, is a bluff, 362 feet high, from whence the land rises to the height of 2,200 feet, at the distance of 4 miles inland. A large rock, 300 feet high, lies 2 cables N.E. of the cape, and is connected with it by a low neck of sand and stones. On a N.W. and S.E. bearing this rock has the appearance of an island. The cape is steep-to, but the strong eddies near it make it prudent not to approach it nearer than a mile.

Taka no saki (Gun cliff), at 9 miles E. by S. ¼ S. from Tatsupi saki, is steep-to, and has a battery of six guns on its apex, which is 200 feet high. There is a remarkable black rocky cliff three-quarters of a mile to the westward of it.

Mi-umaya bay.—In the bay between Tatsupi saki and Taka no saki, off the town of Mits-umaya, at about half a mile from the shore, there is capital anchorage in 8 fathoms ; indeed it is the best in the strait next to Hakodate. A short distance southward of the town there is a fine stream from which good water may easily be obtained. Wood is also abundant.

After passing Taka no saki the shore is less steep, and bottom will be found in from 30 to 40 fathoms right across the entrance to Awomori bay, to the opposite coast of the peninsula of Nambu. From the south point of this coast a steep cliffy shore, with deep water close to, trends 25 miles to the N.N.W., nearly in a straight line to Toriwi saki. The cliffs are coloured with the most brilliant and varied tints, and, like the entire coasts of the strait, are of basaltic formation.

Red cliffs and Double head.—Among the most remarkable are the Red cliffs, rising to the height of 1,600 feet, at 17 miles southward of Toriwi saki. At 9 miles farther to the northward are two remarkable pointed cliffs, named cape Yakosi (Double head). Nearly 2 miles to the S.W. of this head is Daiyo rock, 42 feet high ; and about 3 cables North from this is a rock awash at low water.

AWOMORI BAY.—The bay, or rather gulf, of Awomori, a vast interior basin at the north end of Nipon, opens on the south side of Tsugar strait, the entrance being 5 miles wide, with high land on both sides. Off the salient part of the west point, some half-tide rocks lie one cable from the shore. The outer coast to cape Kusodomari, the eastern point of entrance, is steep, sharp, and well populated ; while after rounding it and entering the bay; creeks more or less deep, sandy beaches, and fishing villages are found. According to the Japanese, no hidden dangers exist. Towards the centre the water is too deep to anchor, but at 2 miles from the shore along the east and west coasts there is generally a depth of from 19 to 22 fathoms, mud bottom, with gravel or sand round Natsu sima, the point on the southern side of the bay. The coast can generally be approached within half a mile, but often the depth decreases suddenly, so that without a pilot or a chart it is not advisable to approach nearer than in 11 fathoms.

West coast.—From Isi saki (about 5 miles south-east from Gun cliff) the coast trends S. ¼ E. for 21 miles to the town of Awomori; a fine cultivated plain stretching inland from the coast opposite Natsu sima to the above town. The faces of the hills are sometimes close to the sea. At 8 miles south of Isi saki is Makana river frequented by large fishing junks, with an important village at its mouth. For 10 miles southward of the river to Awomori, there is a uniform sandy beach bordered by villages that nearly join each other, at half a mile from which there is a depth of 7½ fathoms, mud bottom, decreasing rapidly.

Isi saki.—At the most salient part of the coast, immediately south of Isi saki, there is a small earthwork, apparently dismantled; surrounded by rocks above water one cable from the shore. At 2 miles south of them, in a narrow plain, is the small town of Taira-tatte, from which the coast southward becomes rugged.

The Town of Awomori* stretches along the beach for nearly a mile. It is the most important town in the bay to which it gives its name, and appears to have from 15,000 to 20,000 inhabitants. The shore is bordered by a fertile plain of rice fields, extending about 10 miles inland to a semicircle of mountains of from 3,000 to 4,000 feet in height, which, in their nothern extension, approach the western coast to within a mile, and finally reach it at the entrance of the bay. A great quantity of rice is exported to Yezo.

The Tsutsumi gawa, a considerable river flows into the sea east of the town, but its entrance is blocked by a bar, the outer edge of which projects 1¾ cables. It is probably more or less changeable, and can be taken only by boats of light draught. There are no fortifications, but large storehouses are situated to the west of the town.

Anchorage.—This anchorage is open to the north; the depths decrease gradually towards the shore, and 9 fathoms will be found at 2 cables from the shore with good holding ground.

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* *See* Admiralty plan:—Awomori anchorage, on chart No. 101; scale, *m* = 3.5 inches.

The white staff, from which a light is shown at night, is conspicuous, and a good berth is in 10 fathoms, with the staff bearing S. by W., and the right extreme of the magazines or storehouses, S.W. by W. ½ W.*

Supplies.—Beef, rice, timber, and firewood can be obtained, and water may be procured from the river by flat boats, but owing to the fact that it drains the rice fields it cannot be recommended.

LIGHT.—From a white staff, situated about 100 yards from high water mark in front of the town of Awomori, is exhibited a *fixed red* light, elevated 45 feet above the sea, which should be seen in clear weather from a distance of 6 miles.

Tides.—It is high water, full and change, at Awomori at 2 h. 58 m.; springs rise 2½ feet.

MO URA, a tolerably deep bay, opens south of Kama ura point, 9 miles north-east of Awomori, and it is said there is a depth of 10 fathoms in it. The best anchorage appeared to be in the northern portion. In the middle and southern, two large isolated cones rise from the sea, and are apparently joined to the shore by a series of banks and rocks awash, that render the passage impassable. Between the two there is an islet and a rugged rock. South of Mo ura there is no remarkable indentation, but at 3 miles from Awomori the heights recede from the shore, and surround a fertile plain, of which that town occupies the centre.

KAMA URA POINT.—From Awomori to Natsu sima the general direction of the coast is N.N.E. for 12 miles. This region is rocky with numerous creeks, and it is thinly populated. The most remarkable point, called Kama ura point, is 3½ miles S.S.W. from Natsu sima.

Kaga sima rock.—At about 1½ cables from its extreme there is an upright rock about 30 feet high, called Kaga sima. In passing at three-quarters of a mile there is no bottom at 14 fathoms; shortly after, 27 fathoms, gravel is obtained at 1¾ miles W.S.W.

NATSU SIMA.—The point of Natsu sima consists of a series of hillocks that slope gradually. The islet at 2 cables from it is rocky and rugged, and is joined to the shore by a neck of sand and rocks awash. There are some rocks off the coast at 8 cables E.S.E. from the islet.

According to the Japanese, anchorage may be had off the south side of the island. Natsu sima is about 100 feet high. At 8 cables distance there are 20 fathoms, the bottom being small black gravel.

Demura point, 3 miles to the south-eastward, is rugged, and about 246 feet high. At the foot of the cliff there is a low sandy point that extends 2¼ cables, and is steep-to. At 3 cables from its extreme there are 13½ fathoms, gravel and shell.

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* Staff-Commander W. H. James, R.N., H.M.S. *Iron Duke,* 1879.

SHIRANAI.*—The bay of Shiranai, 2 miles S.E. from Demura point, is about 1½ miles deep, and about the same width at entrance; but shoal water extends half a mile from the shore at the head of the bay. The south-east coast is low, and in 4¼ fathoms the bottom is rocky, there being no mud except in the centre; the rest is sand. In the west part of the bay are three small villages, and the shore on the south-west is wooded. The north point is steep-to, and ends in a hillock surmounted by a clump of trees.

Anchorage may be obtained in 7 fathoms, with the north point of entrance bearing N.N.W. ½ W., distant 7 cables. This anchorage is tolerably sheltered and has good holding ground, but appears to have few resources.

At 7 miles from Shiranai is the bay of Nofitsi, between which the coast rises gradually, and forms several indentations of little importance. At a mile from the shore there are 13½ fathoms, and the extreme point may be passed at half a mile in 8¾ fathoms.

NOFITSI† lies in the south-east bight of Awomori bay; towards the south the land is tolerably low and uniform. The anchorage may be recognised some distance off by an isolated wood, that stands out against the sky.

The anchorage is in a large semi-circular indentation in front of the town at 6 cables from the shore in 6½ fathoms, gravel bottom. The depth decreases rapidly from 11 fathoms, and the holding ground is fair, but a heavy sea comes in with northerly winds. On the north-west side of the bay, 2½ miles from the town, is a bank of large stones, running out 4 cables, the end of which is nearly awash, and on which the sea often breaks. The east part is composed of little red cliffs with sandy beaches between. The town proper, in the province of Nambu, is half-a-mile from the coast on a hillock. At the shore, there is only a large village, 3 cables west of which a river disembogues; junks of 20 tons might go in, but it is barred by a bridge a short distance from its mouth. There is considerable traffic in copper. Nofitsi is one of the stations on the main road between Awomori and the capital, Tokio.

The COAST.—From Nofitsi the coast takes a northerly direction for 25 miles to Ando, and is low and uniform, an isolated hill 1,300 feet in height rising from the middle of the space between Ando bay and the sea.

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* *See* Admiralty plan :— Shiranai bay, on sheet No. 101; scale, *m* = 3·5 inches.

† *See* Admiralty plan :— Nofitsi anchorage, on sheet No. 101; scale, *m* = 2·4 inches.

BAY OF ANDO.—The bay of Ando is the north-east bight of Awomori bay; it is open to the south, and shoals gradually towards its head. Vessels can stand in until the peak over Ando bears W. by N. ⅓ N., where there is anchorage in 6½ to 8 fathoms, mud bottom. The bottom here shoals abruptly.

Port Ando.*—South-west of the anchorage at the head of the bay there is a fine basin, sheltered by a bank of sand running parallel to the coast. It may be entered safely by steering up mid-channel until abreast of the sandy point, when the north-east coast must be kept on board until abreast the second village (Ando) where there is good anchorage in from 3¾ to 5 fathoms, muddy bottom.

The sandy tongue and the south-west shore of the bay have off them banks of mud and muddy sand contracting the anchorage for vessels of ordinary dimensions to 8 cables by 2½ cables. The entrance is over 2 cables wide between the point of the sandy spit and the village of Oō-shira, but only 1¼ cables wide between a depth of 3 fathoms on either side. The extreme of the sandy point covers a short distance at high water. The large village (Oō-shira) on the north-east side of the interior basin can be approached within a cable, where anchorage may be had in 5¼ fathoms.

The north point of the sandy tongue above mentioned is in lat. 41° 16′ N.

The Japanese villages are poor, their inhabitants subsisting by fishing. Six junks were moored before the principal village (Kanaya), and there was a large one being built.

Supplies.—The slopes of the hills are partly cultivated and partly wooded with a species of pine. The *Dupleix* bought wood here for steam purposes, and also fresh provisions. Water flows down the mountains by many streamlets, and is easily obtained; also at the head of the bay fish is plentiful. The place belongs to the prince of Nambu, and is part of the district of Tanabu.

Tides.—The tides are felt more at Ando than at any other part of the bay, and attain a velocity of 1¾ knots. It is evidently their action that has formed the bay.

The COAST, from Ando trends towards S.S.W., then turns towards the west and south-west to Ben-ten sima. In the part of Awomori bay near Ando are long sandy beaches and numerous villages, the largest being Kawa-atchi, at the entrance of a river, off which junks usually anchor. Towards the angle of the bay, a considerable range approaches the coast, the summit nearest to Ando being 3,120 feet high and visible from nearly all the bay. To the eastward of these mountains the land is very low and has the aspect of a uniform plain covered with wood; beyond this the summit of Siriya saki is seen.

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* *See* Admiralty plan :—Port Ando, on sheet No. 101; scale, *m* = 5·5 inches.

CAPE KUSODOMARI, is on the eastern side of the narrow entrance to Awomori bay; the coast from Ando trending to the south-west for 18 miles.

Ben-ten sima.—At 2 miles S.E. ¼ E. from Kusodomari, and at 5½ cables from the shore are the two islets of Ben-ten sima, the smallest being a mere pinnacle rock about 100 feet high. A rock on which the sea breaks lies one cable S.S.W. from the island. There is a passage for junks between the islets and the shore, but the Japanese say it would be imprudent to take it with a large ship. A depth of 33 fathoms was found one mile south of the islets.

The COAST for 15 miles north of cape Kusodomari is bold and cliffy, with deep water close along it.

Daiyo rock, 40 feet high, lies 8 cables from the shore, 10 miles S.W. by S. of Toriwi saki; and thence as far as the cape the coast, except in the immediate vicinity of Toriwi saki, is bold and rocky, backed by high, densely wooded hills. No dangers are known to exist at over 4 cables from the shore.

TORIWI SAKI, is a low tapering point, off which, at the distance of half a mile is Omasaki sima (Low islet), 45 feet high. The ground all around this cape and islet, and for about 2 miles along the coast on both sides, is very foul.

Soundings.—Tide rips.—The soundings off Toriwi saki are irregular, a ledge of less than 20 fathoms extending about 3½ miles to the N.N.W., off which the water rapidly deepens, especially to the northward, and eastward. The East going stream sweeps over this ledge, and through the channels between the rocks and point, with great velocity, causing a great number of swirls tide rips, and overfalls, which sometimes, especially with easterly winds, are very heavy.

Anchorage may be oabtined out of the strength of the tide in 10 to 12 fathoms, one mile East of the point; but as the bottom everywhere in this neighbourhood is composed principally of rock, caution is necessary.

Singapore rock, with a depth of 9 feet on it at low water spring tides, lies E.N.E. 8 cables from the centre of Low islet, and is at the extremity of a sunken ledge, with from 6 to 17 fathoms on it, connecting this rock with Low islet, excepting in which direction the soundings round it vary from 13 to 21 fathoms.

At 6 cables N.W. by N. of Omasaki sima is a rocky patch on which is a depth of only 2½ fathoms at low water.

CAUTION.—Singapore rock is surrounded to a considerable distance by the most conspicuous of the overfalls existing in the vicinity, all of which should be carefully avoided. The passage between the rocks, the island and the point should not be attempted.

Yake yama saki, 8 miles south-east of Toriwi saki, is a bold headland sloping down from the high hills at the back; it is very steep-to, and may be passed in safety at a distance of a quarter of a mile.

From this point the coast trends to the westward as far as Iko Kuma and then north-west to Toriwi saki, and is generally rocky.

Aka-gawa mura and Red cliff are two prominent points, about 2½ miles south-east from Yake yama saki, the former is low and green, the latter fronted by red cliffs about 100 feet high.

Midzu Sawa Kanake, 2½ miles S.S.E. from Red cliff, is a prominent green bluff about 350 feet high, fronted by dark cliffs.

The Coast from within two miles of Toriwi saki to Minando mura, is generally bold and rocky, backed by high densely wooded hills. No dangers are known to exist at a greater distance than 3 cables from the coast.

Minando Mura and Ohata, at 1½ miles S.S.E. of green bluff, are towns at the mouth of a small river which runs down from the hills. Junks are generally seen at anchor here in 10 or 12 fathoms, loading with timber which is brought down the river. Junks of large size can be taken over the bar at high water, in fine weather.

The COAST from Minando mura, to Ūiya mura lying about 11 miles to the eastward, forms a bay with a sandy beach, backed in places by low, earthy, reddish coloured cliffs; it is free from dangers, th soundings are regular, and anchorage may be obtained anywhere in from 7 to 10 fathoms.

Within 4 miles of Siriya saki (see page 337), the coast rises to 1,321 feet (Whale back), and descends again towards the cape in a gentle slope, appearing at a distance like an island.

YEZO ISLAND.*

The coast line of Yezo is about 1,000 miles in extent, and its eastern shore appears low from seaward, resembling table-land; its appearance is however, most deceptive, as the country is a repetition of abrupt hills of a uniform height, interspersed with deep valleys, rivers, swamps, and large lagoons.

The western coast is bold, and ranges of lofty mountains, many of the summits of which are extinct volcanoes, rise in every direction. The highest of these, Shubets, a cone-shaped mountain 30 miles inland, is an active volcano, and from its size and grandeur may well be considered by the Japanese as the Fusi yama of Yezo.

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* *See* Admiralty chart:—Yezo island with the adjacent straits of Tsugar, La Pérouse, and Yezo, No. 452; scale, $m = 0 \cdot 08$ of an inch.

The island is almost entirely covered with wood, the ground being in many places strewn with the trunks of trees in all stages of decay, and covered with moss, lichen, and rank vegetation; and the coarse bamboo grass is found in some places growing to a height of 15 feet.

There are numerous rivers and streams, the largest of which, the Iskarri, is on the west coast, and three or four large lakes are said to exist in the interior. Coal is found in several places, but is principally procured from the village of Kamaini, near Iwani, on the west coast. Sulphur abounds, and sulphur springs are numerous.

Yezo is a conquest and colony of Japan, and small settlements of emigrants from the south, and of natives are found scattered along the shores. The Ainos or aborigines of Yezo are a race of stunted growth, and are grossly ignorant, wretchedly poor, and filthy both in person and habits; unlike the Japanese, they allow their hair and beards to grow to a great length.

Little agriculture is carried on, both Japanese and Ainos principally subsisting on the produce of the ocean. Salmon and herring fishing on a large scale is their principal occupation, and large quantities of seaweed are collected, dried in the sun, and sent south, finding its way into all parts of Japan and China.*

SOUTH COAST.—Cape Sirakami (Nadiejda), the north point of western entrance to Tsugar strait, is a high bluff similar to cape Siwokubi, but not so safe of approach. The coast, for more than a mile on each side of the cape, is bordered with numerous rocks, generally above water, some of which extend nearly 2 cables from the shore. As it is not known whether the dangers extend under water beyond this distance, it will be prudent to give the cape a good berth in passing.

Matsumai.—From cape Sirakami the coast trends W. by N. ¼ N., 5 miles to cape Tadeisi, which latter is low, and off it is a conical islet with a small temple or building on it. The bay between is very rocky, excepting off the east end of the city of Matsumai, where there is good anchorage in 12 fathoms at half a mile off shore; but this anchorage would, of course, be unsafe in southerly winds. H.M.S. *Sybille* in 1855 coasted along this bay at about 2 miles off shore, and had irregular soundings 16 to 25 fathoms, shoaling suddenly when near the city from 13 to 5 and 7 fathoms.

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* The description of Yezo island is principally compiled from the remarks of Commander H. C. St. John, who circumnavigated it in H.M.S. *Sylvia*, 1871; and those of Captain Blakiston, R.A., published in journal of Royal Geographical Society, Vol. XLII., 1872.

KO SIMA, a small island about three-quarters of a mile in extent, lies W. ½ S. 16½ miles from cape Sirakami, the north-west point of entrance to Tsugar strait; it rises in three peaks of nearly equal height, between which is an old crater. The western peak, which is slightly higher than the other two, is 1,009 feet high. Ko sima is precipitous except on the eastern side, where landing may be effected.

Sugarloaf rock, 4 cables west of the island is 466 feet high; between it and Ko sima, are two smaller rocks about 35 feet high.

O SIMA, 2,359 feet high, lies N.W. by W. ½ W. 22 miles distant from Ko sima. The island, which has the appearance of an extinct volcano, is 2¼ miles long, east and west, and about 1½ miles in width; steep-to all round, and free from off-lying dangers. Its northern and western sides are rugged and in places precipitous.

CAPE TSIUKA, 12¼ miles N.E. by E. from cape Sirakami, is a high cliffy point, which may be further known by three rocks extending a quarter of a mile from a point one mile north-eastward of it; the outer rock of the three is of a conical form and 70 feet high. The land to the westward for 4 miles is high and cliffy; about half way between the cape and the end of the cliffs there are two waterfalls.

Fuku sima bay.—Vessels can anchor off the village of Fuku sima, in the bight of the bay, between capes Tsiuka and Sirakami; but as a southerly wind on the western tide sends in a cross swell, it would not be prudent to anchor far in. The best position is in from 15 to 20 fathoms, with the southern white cliff bearing West about one mile distant.

HAKODATE HARBOUR.*—The port of Hakodate, on the north side of Tsugar strait, is situated at the foot of the northern slope of a high peninsula which is connected with the mainland of Yezo by a low sandy isthmus. The bay is 4½ miles wide at its entrance between Hakodate head (Ohobana point) and Mussell point, which bear east and west of each other; and it is 5 miles deep. The harbour is in the south-eastern arm of the bay, and is completely sheltered, with regular soundings and good holding ground, the best anchorage being in a depth of 5 fathoms, (black mud bottom), in a line with the avenue leading to the governor's house. The town of Hakodate stands on the north-east slope of the promontory, facing the harbour, and exports herring oil; bear, river and sea otter, and deer skins, antlers, and edible seaweed. This latter commodity is exported in large quantities, and junks of 200 to 300 tons visit the harbour engaged in this trade. In foreign bottoms alone over 100,000 piculs (6,000 tons) is exported annually.

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* *See* Admiralty plan:—Hakodate harbour, No. 2,672; scale, *m* = 2 inches.

Vessels, even when seriously damaged, can undergo repairs in the harbour, there being no scarcity of materials for this purpose. Timber of any dimensions can be procured, though not in great quantity: its price is very moderate. There is no want of coopers, but owing to the scarcity of iron they use bamboo for hoops.

There is a brass and iron foundry, though worked on a limited scale. No copper sheeting can be obtained. The native sheet copper is very thin and small in size. Ships' boats can be repaired or constructed by the Japanese in a very skilful manner from drawings.

The town and harbour are defended by an imposing pentagonal fort placed on the shoal part of Anama point at the northern extreme of the promontory.* It is constructed for 52 guns, and the walls are faced exteriorly with large uncemented irregular blocks of soft granite, inside of which are smaller stones; the parapet is of earth, turfed. The fort is separated from the town by a moat, always filled with water. Another fortification of earth, to mount 60 guns, is being erected on the isthmus; it will be a kind of bastioned fort. There are also two 2-gun masked batteries on the western side of the bay.

Hakodate, since the development of Yezo, has been taken in hand by the colonization department, and the port has increased largely in importance, local trade being greatly extended. Trade is being principally carried on in Japanese vessels, and the number of foreign vessels visiting the port is falling off.

Spit.—From Anama point, a shoal spit, on which there are depths of from 1½ to 4 fathoms, extends northward for one mile. This reef (of stones) serves to break the swell with winds from the south-west.

LIGHT VESSEL.—A light-vessel (Kai-sho-maro No. 2) painted red, with two masts, carrying a red ball at the foremast head, and exhibiting a *fixed* white light elevated 36 feet above the sea, is moored in 7½ fathoms (at low water spring tides) off the most northern point of the spit which projects from Anama point, with the mouth of Kamida creek bearing E.S.E., and White bluff S. by W. The light should be seen in clear weather from a distance of 10 miles.

Fog signal.—During thick and foggy weather a bell is sounded *five times* in quick succession at intervals not exceeding *five minutes.*

Caution.—Vessels of large draught entering the harbour should pass north of the light-vessel, as there is a bank of boulders and stones directly south of her.

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* From remarks of Lieutenant Nazimoff, Russian navy, 1859.

Beacons.—At 5 cables S. by E. ¼ E. from the light-vessel, is a triangular floating beacon, moored in 5 fathoms. The passage between the light-vessel and the beacon may be taken by vessels drawing less than 18 feet water.

South of the beacon the bottom is composed of large stones, and is very irregular. The banks on the east side of the bay (of less than 3 fathoms) extend half a mile from the shore, and must be avoided.

Two white triangular beacons also mark the 3 fathom edge of the bank on the western side of the inner anchorage. They bear N. by W. ½ W. and S. by E. ½ E. from each other, are 3½ cables apart, and are in 20 feet at low water.

Anchorage.—A vessel can moor at a little over half a mile from the shore in 5½ fathoms, mud, good holding ground. In less than that depth the bottom is gravel, and anchors hold badly. Vessels are prohibited from anchoring with the light-vessel bearing between N. by E. (through East and South) and S.W. at a nearer distance from her than 5 cables. Eastward of these limits there is no restriction as to anchorage.*

Supplies.—Water can be easily obtained from Kamida creek, which enters the harbour to the northward and eastward of the town, but the operation is attended with danger to the boats, which have to be dragged over the bar of the river. The Japanese supply fresh water which they bring off in tubs in their own boats at a very moderate rate. A supply of good wood for steam pnrposes, made up in large bundles, can be procured in considerable quantities at Hakodate, and from the Japanese villages in the south of Yezo, and north of Japan. It burns rapidly with a large flame. The proportion required is 2½ times the weight of coal, and the price varies from two to four dollars, according to localities; and water may also be ordered through the Custom house, at the bazaar, or from the American agents residing at Hakodate.

The seine supplied the American squadron in 1854 with fine salmon and a quantity of other fish, and the shores of the bay abound with excellent shell-fish. Beef, potatoes, sweet potatoes, fowls and eggs, and all necessaries can be procured. For large supplies of provisions, masters of ships should have recourse to the American agents.

Merchant vessels entering the port are subject to the Custom house regulations. The laws relating to imports and exports may be learned from the consuls. Japanese tow in a raw state may be purchased at 121*l.* to 140*l.* per ton. Coal (of inferior quality) is also procurable.

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* This restriction is to prevent the light from the light-vessel being hidden by the shipping at anchor.

Pilots.—Vessels entering the bay are boarded by pilots, who charge five Mexican dollars, without any distinction as to the size of the ship. There are no special harbour regulations.

Tides.—It is high water, full and change, in Hakodate harbour at 3h. 37m., springs rise 3½ feet, neaps rise one foot.

Directions.—Entering Hakodate harbour,—after rounding Hakodate head, and giving it a berth of a mile to avoid the calms under the high land, steer for the sharp peak of Komaga-daki, bearing about North, until the eastern peak of the Saddle mountain, bearing about N.E. by N., opens to the westward of the "Round knob" on the side of the mountain, then haul up to the northward and eastward, keeping them well open until the centre of the sand hills on the isthmus, eastward of the town, bears S.E. by E. ¾ E. (these may be recognised by the dark knolls upon them). This will clear the spit which extends northward from Anama saki, the north-western point of the town. Round the light-vessel, passing northward of her, and haul to the south-east anchoring as convenient in 6 to 8 fathoms, taking care to keep the light-vessel bearing westward of N.W. by N. to avoid the shoal bank off the town. Should the light-vessel be removed, then bring the sand hills a point on the port bow, and stand in until Anama saki bears S.W. ½ W., when the vessel will be in the best berth, in 5½ or 6 fathoms water.

If it be desirable to get nearer in, haul up a little eastward of South, for the low rocky peak which will be just visible over the sloping ridge to the southward and eastward of the town. A vessel of moderate draught may approach within a quarter of a mile of Tsuki point, where there is a building yard for junks. This portion of the harbour, however, is generally crowded with vessels of this description, and unless the want of repairs or some other cause renders a close berth necessary, it is better to remain outside.

Entering the harbour at night bring the light to bear N.E. ¾ N., and steer for it, taking care not to bring it to bear north of that bearing. Round it as before directed, and anchor as convenient. Should the light be removed, steer a northerly course on entering Hakodate bay to a depth of 7 fathoms, and keeping in that depth on an easterly and south-easterly course the spit will be safely rounded.

Should the wind fall before reaching the harbour, there is good anchorage in the bay, in 25 to 10 fathoms water. During spring this harbour is subject to violent gusts of wind.

CAPE SIWOKUBI (cape Blunt) bears E. by S. 12 miles from Hakodate head, and N. by E. ¾ E. 9½ miles from Low islet on the Nipon shore, between which is the narrowest part of Tsugar strait. The cape is steep-to, and the north-east current frequently runs with greater streng close to the rocks than out in the stream. The summit of the bl immediately above the cape is 1,022 feet high; from thence the high la ranges in towards the Saddle mountain. The coast for about 7 miles to t westward is a level plain of an average elevation of 200 or 300 fee beyond 7 miles it descends to the low beach connecting the high land Hakodate head with the main.

CAPE YESAN (Esami of Broughton), the north point of easte entrance to Tsugar strait, is the east extreme of a bold promontory, w several remarkable dome-shaped mountains in the rear. The cape its is a steep cliff about 600 feet high; the volcano immediately above it 1,935 feet high, and frequently capped with a light cloud of steam, an jet of steam is constantly seen issuing from a hollow on the west side of t hill, but it is not otherwise active. The west side of this mountain covered with patches of sulphur, having the appearance of snow at a distan

Anchorage.—There is anchorage in the bay about 2 miles westwa of the cape; a kedge or stream anchor is recommended to be used wh unable to make way against the tide.

Conical islet.—At 2½ miles E. ⅔ S. from cape Siwokubi is Coni islet, 200 feet high, lying close to the coast, which in its immediate neig bourhood is high and cliffy, and the approach steep and safe. There however, a dangerous low point one mile to the westward; and at 2¾ mi to the eastward is Foul point, which is low, and has a dangerous r extending 2 cables from it.

Directions for TSUGAR STRAIT.—Sailing vess approaching Tsugar strait from the westward during foggy weather shou guard against being carried by the current to the northward past t entrance. Should the weather be clear when nearing cape Yokoiso, it m be as well to sight it; but if doubtful, shape a course (allowing for t probable current) direct for Oho saki. Should a fog come on sudden when nearing this cape, recollect that the coast is clear and sandy, and t soundings are regular to the southward, but rocky with irregular soun ings to the northward of it. The cape is steep-to, and standing o prominently from the coast line, forms a good landmark.

No particular directions are required in passing through the strait fro the westward, the only dangers being those off Toriwi saki abo described, and the Rattler rock off Siriya saki (*see* page 337), and t north-easterly current will always be found strongest in the middle the strait. After passing Tatsupi saki, if the weather is thick, and t vessel bound to Hakodate, endeavour to make cape Tsiuka, and proce from thence to Mussell point; or giving cape Tsiuka a berth, feel the w by the lead into the bay, between it and cape Saraki, and anchor till the weather clears.

Approaching the strait from the eastward, steer for Siriya saki, and endeavour to make it on a N.W. bearing. Pass the cape at not less than 2½ miles distant, then haul in to avoid the current and to anchor should it fall calm. In this case, by keeping this shore close aboard, the vessel may probably be drifted up to Low islet (off Toriwi saki,) by the western stream, when the north-east current is running like a mill stream in mid-channel.

At the anchorage off Low islet the vessel must wait a favourable opportunity for crossing the strait. During the summer months the winds are generally light from the south-west for a considerable period; the wind, however, generally freshens a little when the western stream makes, and this is the right time to weigh. Pass about half a mile from Low islet, between it and the Singapore rock, and in crossing the current take care not to be set to leeward of Hakodate. If proceeding straight to Hakodate from the eastward, the better course is to cross the strait, and passing about 5 miles off Siriya saki, make for cape Yesan; so as to take advantage of the cold westerly set along the south shore of Yezo.

Proceeding from Hakodate to the westward against S.W. winds, keep well inside cape Tsiuka, and if unable to round it, anchor with the stream or kedge about 2 miles to the north-east, weighing again when the next western tide makes. Should the wind be very light, a vessel may not clear the strait in one tide; in this case it will be better to wait a tide to the eastward of cape Sirakami, and take the whole of the following tide to clear the strait, than run any risk of being swept into the strait again by the current. Vessels passing through the strait, particularly to the westward, should have a good kedge and 150 fathoms of hawser ready for immediate use, and must keep the land close on board.

Tides.—The tide in the stream runs about 12 hours each way near the full and change of the moon, and there are two regular tides by the shore in 24 hours. At full and change the flood or eastern stream makes at Tatsupi saki at 6h. 30m. a.m., at 7h. 0m. at cape Tsiuka, and at 7h. 30m. at Toriwi saki. The western stream begins about 12 hours later. The turn of the stream takes place 1½ hours later every day. With heavy S.W. gales the north-easterly current swells and fills the strait, attaining a velocity of from 5 to 6 knots an hour, and entirely overcomes the ebb tide. (For winds and currents, *see* page 27.)

WEST COAST of YEZO.—Of the coast, from cape Sirakami, (the south-west point of Yezo) to cape Nossyab, (the north-west point) comparatively little is known, and there are but few good anchorages. The best is Oterranai in Iskarri bay, between which and Hakodate there are no anchorages, except with an off-shore wind, and then only at Sutt bay and cape Rodgers.

CAPE RODGERS (Su ne go), is a prominent, low, green point, in lat. 41° 48′ N. It forms a bay on its north side, where convenient anchorage may be obtained in 7 or 8 fathoms water, sheltered from N.E. or S.E. gales.

YESASSHI, in lat. 41° 52′ N., is the principal town on this part of the coast, and is said to contain about 10,000 inhabitants. Off it lies Kamone sima, a small rocky islet almost connected to the mainland by a sand bank forming an excellent shelter for junks, numbers of which frequent this anchorage during the summer months.

Anchorage.—Larger vessels may anchor in 7 or 8 fathoms water, with the north end of Kamone sima bearing about S.W.; they should, however, leave if the weather threatens to be heavy from the westward, between North and S.S.W.

The COAST, between Yesasshi and Odobe, a distance of 4½ miles is nearly straight. At 4 miles inland from Yesasshi is a prominent group of hills, partially wooded, nearly 2,000 feet high.

Flusido tatte iwa.—In the vicinity of Fusido tatte iwa rocky patches extend about 6 cables from the shore.

Odobe no tate, one mile north of the town of Odobe is a conspicuous white cliff 210 feet high. In the neighbourhood of Odobe, the hills are much lower than those either northward or southward, and are not wooded. The main road to Hakodate passes close to the town.

Made iwa.—From Odobe to Sibi no saki, a distance of 7 miles, the coast line is more broken; there are however no off-lying dangers. Made iwa, 3 miles north of Odobe, is a conspicuous dark-coloured pillar of rock, 70 feet high.

SIBI NO SAKI, is a low, prominent point, fronted with smooth, reddish, sloping rock. At one mile north of this point, and close to the shore, is a conspicuous round rock 35 feet high.

The COAST, from Sibi no saki trends to the north-north-east for about 6 miles, is almost straight and is composed principally of sandy beaches. At that distance is a very remarkable white cliff visible in all directions for a considerable distance from seaward. From the cliff the coast takes a westerly direction for about 4 miles to Seki nai no saki.

From Seki nai no saki, in lat. 42° 8′ N., the coast takes a N.N.W. direction for about 6 miles to Kudo. It is almost straight, bold, rising in many places in dark coloured cliffs about 100 feet high, and is free from danger with the exception of a rock awash off Nagai iso, lying 1¼ miles north of the point and half a mile from the shore.

KUDO BAY, 5½ miles northward of Seki nai no saki is open to the south-west. The bay has a white sandy beach, off which anchorage may be obtained in 8 to 10 fathoms, sandy bottom.

OTA SAKI, in lat. 42° 15′ N., is 5½ miles north-west from Kudo bay: the coast northward towards Biwa no saki, a distance of miles, is very bold and precipitous, with deep water close to, and is backed by densely wooded hills from 2,000 to 3,000 feet high.

OKUSIRI STRAIT.—The island of Okusiri lies off the coast of Yezo westward of Ota saki, between which it forms a strait 9 miles wide, with depths of 200 to 300 fathoms in mid-channel.

The COAST from cape Rodgers to cape Ota is occupied by small villages, inhabited only during the summer months by fishermen and sea-weed collectors; the product being generally sent to Hakodate. There is but little cultivation anywhere on this coast, nor can supplies of any sort be obtained.

OKUSIRI ISLAND, situated off the west coast of Yezo, is for the most part densely wooded and rises gradually to a height of 1,955 feet; the summit, which is ill-defined, is near its centre, but rather towards the western side. Between the summit and the north point of the island are two moderately sharp peaks, 1,493 feet and 1,363 feet high, which show conspicuously when seen from north-west or south-east. From the northern of these peaks the land declines gradually to the north point, (Gomiga saki,) which is low and tapering, but rendered conspicuous by a small round hillock 237 feet high, about half a mile from the extreme point.

There is no cultivation on the island of Okusiri. The population in 1881, was about 300 Japanese, and a few Ainos, who earned a precarious livelihood by fishing, collecting seaweed, shell-fish, &c.

The strait between Okusiri and the mainland of Yezo, is 9 miles wide at the narrowest part, and is nearly 300 fathoms deep in the middle.

Reef.—A reef of rocks extend about half a mile north from Gomiga saki, generally visible, but should be given a wide berth.

East coast, from Gomiga saki to Imako no hana, is almost straight, and steep-to, the land falling almost vertically into the water, the depth at one mile from the coast is over 100 fathoms. Junks obtain an anchorage during westerly winds, off Tsurugaki-mura, north of Arch rock.

West coast, from Gomiga saki to Kuki-ya no saki, is rugged and steep-to. Off Isoya-zaki, a chain of rocks extend nearly half-a-mile in a N.W. direction; the outer rock is two feet above high water.

Conical islet.—Two and a half miles north of Kuki-ya no saki and 3 cables from the shore is a conical islet 300 feet high.

Rocks extend about 7 cables W. by S. of Kuki-ya no saki, the ou being 26 feet high.

Awanai no saki, the south point of Okusiri, is low and taperi curving slightly to the eastward.

Morotsu no sima.—Much foul rocky ground exists southward the south extreme of Okusiri, terminating at 3 miles from the point the group of rocks named Morotsu no sima, about 25 feet above high wat and composed of large masses of black lava. Foul ground extends tc distance of 1¼ miles on the east, 7 cables on the west, and 4 cables on t south side, of the highest Morotsu no sima rock. These rocks should i variably be given a berth of at least 2 miles in passing, nor should a ves attempt to pass between them and the shore of Okusiri.

The coast on the eastern side, between Awanai no saki and Imako hana, forms a bay, with a sandy beach, fronted with shelving rocks; it well protected from all winds between S.W. (through west) and North.

Anchorage may be obtained in from 8 to 10 fathoms, with the sm temple on the low shoulder of the hill over the south end of the villa bearing about W.S.W. or West. Although the bottom is sand the holdi ground is good. No vessel should risk being caught here in an easte wind, as a heavy sea then rolls into the bay.

Tides.—It is high water, full and change, at Awanai point, at 3h. 30n springs rise about 1 foot 6 in., neaps are very irregular. No regular tic stream was observed, but, as a general rule there is a steady set northwa both in the strait and westward of Okusiri, but this is not to be depend on. In the strait, during a strong S.W. gale in September 1881, H.M. *Flying Fish* experienced a considerable set to the southward.

The COAST of Yezo from cape Oota (opposite the north end Okusiri island) is bold and steep-to, and trends about N. ½ E. for 20 mil as far as cape Sutsuki; thence it suddenly trends to the east-north-e for a further distance of 20 miles to Bekhei misaki.

SUTT BAY,[*] in lat. 42° 48′ N., is about 4 miles wide betwe Behkei misaki, its western entrance point, and the shore opposite; a about 3 miles deep. It is open to winds between N.E. and N.W., b anchorage may be had in fine weather either at the head of the ba abreast a river in the south-west corner, in 7 fathoms, at 6 cables fro the beach; or on the western shore off Sutt village in about 13 fathor at 3½ cables from the shore.

SIRU-UNKU (IWANI) BAY, opens at 15 miles nort east of Sutt bay, in lat. 43° 0′ N., long. 140° 32′ E., a short distan northward of an enormous cliff known as Raiten. The Japanese work coal mine of good quality, situated in the northern arm of the bay, where there is a fair anchorage, and lighters can load easily. The materials for working the mine are complete, with tramways to carry the coal to the coast. There are two shafts in operation, that work easily, and when all is in order 100 tons a day can be readily obtained. Off shore, 2 miles from the point that divides Iwani bay into two parts, is a rock with not more than 6 feet of water on it. The settlement is in an open bay, and possesses no shelter except from an easterly wind.

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[*] *See* Admiralty plan:—Sutt bay No. 993; scale, $m = 1 \cdot 1$ inches.

The COAST, from Iwani bay trends for 20 miles to the north-west, is high, and apparently steep-to, without any anchorages along it.

CAPE NOVOSILZOV, 22 miles north of Iwani, is the north-west point of a high bold promontory which projects 20 miles in a north-west direction. It is 15 miles across, and its summit, mount Shakotan, rises to a height of 4,287 feet: off the cape are several rocks. At 7 miles E.N.E. from cape Novosilzov is cape Taka sima the north extreme of the promontory.

MALOYAMA BAY,* 9 miles south-east of cape Taka sima is open to the north-east, but anchorage may be obtained here off the village in 9 fathoms, at about half a mile south of the north-west point of the bay; sheltered from North, through West and South to E.S.E. Small vessels can anchor farther in in 7 fathoms, with Observation point bearing N. by E., distant 2 to 2½ cables.

Youichi river enters the sea in a small bay about 11 miles westward of the west point of Oterranai bay. The village is situated on a level beach which curves round to the high land of the cape on the north side of the bay.

CAPE SKUDUTZS (Hiyori yama), is the termination of the rocky ridge of Kawasiri yama, 1,215 feet high.

LIGHT.—From a lighthouse 33 feet high, constructed of wood and painted white, situated on cape Skudutzs, elevated 162 feet above the sea, is a *fixed* white light, visible seaward between the bearings of E.S.E. and N. ¾ W.; it should be seen in clear weather from a distance of 17 miles.

ISKARRI BAY.—From cape Skudutzs the coast trends to the southward for 1½ miles, forming small indentations, with rocky points between; it then curves to the westward and southward for 2½ miles, forming Tamiya and Otaru bays, separated from each other by a point which forms a sandy hook, off which are several rocks, and having immediately over it a hill 204 feet high. On the shores of the former bay are the villages of Tamiya and Ironai, and on those of the latter the village of Oterranai. From Kumawusu, the eastern point of Otaru bay, the coast (bordered by houses) trends E.S.E. for 1½ miles to Kamidani no misaki, the coast betwee which and Skudutzs forms a large indentation known as Iskarri bay.

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* *See* Admiralty plan:—Maloyama No. 993; scale, $m = 1{\cdot}15$ inches.

OTERRANAI,* is an important settlement, and has the advantag of being the only safe anchorage on the north-west coast of Yezo; it is th port of Iskarri, the greatest salmon fishery in the island.

The bay is open to the eastward, but is well sheltered between N.W. an S.E., and is at all times safe, and might be made an excellent harbour.

When approaching this anchorage a remarkable red patch of cliff, an white sandy spots, just west of Skudutzs, mark its position. After roundin cape Skudutzs, steer into the bay, bringing the easternmost bluff to bea N.E., or further in for a smaller vessel.

There are huts and houses all round the bay; they also extend more c less for 9 miles eastward, terminating in a village called Yunibako.

The great resource of Oterranai is its herring fishery, the most producti on the whole coast of Yezo. In 1869 the resident population was 3,50 persons, increased in the fishing season to 6,000.

About 6,000 tons of herrings annually are dried and shipped off for tl southern ports. Herrings are also dried, and boiled down for manure, an sent south; edible seaweed is also procured.

Tides.—The rise and fall of the tide is less than 2 feet.

Sappro.—The capital of Yezo consisted in 1872 of about 100 wood huts or houses. It is 24 miles S.E., from Oterranai, and 20 miles south Iskarri, consequently it is about 15 miles from the sea. A new road is bei made to Endermo harbour. The country is perfectly wild, and entire covered with wood, and much of it is fine timber, hard wood, oak, &c.

ISKARRI.—Iskarri is a settlement about 15 miles east from Oterran by water, and about 20 by land, situated at the mouth of the largest and fin river in Yezo, of the same name. There are about 100 houses at the pla with fishing stations at intervals up the river, for some miles.

On the bar at the river's mouth there is a depth of about 10 feet,† a inside and along the western sandy bank of the river, on which the sett ment is built, there is 6 and 7 fathoms. There are some large houses a substantial godowns at Iskarri, but a great part of the settlement consi of temporary buildings occupied only during the fishing season. Lar numbers of junks arrive here, mooring off the village alongside the ri bank. The population in 1869 was about 800, besides the crews of t junks. The Iskarri river is noted for its salmon fishing, and exports annua over 3,000 tons of fish; the river is 200 to 300 yards in width for a c siderable distance, and it is said to be navigable for light-draught vessels a great distance. A small steamer could get as far as the lake about 37 miles up the Iskarri river.

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* *See* Admiralty plan:—Oterranai, No. 993; scale, $m=2\cdot5$ inches.

† The bar silts up when the north-westerly gales set in and remains shallow duri the winter, opening again with the spring floods, caused by the melting of the snow the interior.

A vessel may anchor outside the bar, but with the wind from the westward she would be much exposed.

In the province of Sappro there are 3,000 Japanese. Potatoes, beans, millet, and wheat are grown, but in small quantities on bits of ground cleared by the cottagers close to their doors. The soil is rich and plentiful, and the lower slopes of the hills well adapted for agricultural purposes.

Supplies.—Firewood can be obtained in any quantity, principally oak and elm; the whole valley of the Iskarri river is covered with hardwood timber.

The COAST.—From Oterranai to cape Nossyab, a distance of 155 miles, the coast is bold and rocky, and is without a harbour or sheltered anchorage. A large river flows into the sea about 33 miles south of cape Nossyab, bringing down immense quantities of large timber, which is taken out to sea and through La Pérouse strait.

CAPE BUYIMAWAS is lofty and precipitous.

The COAST, northward from Iskarri as far as cape Buyimawas is for the most part high and precipitous, the mountains being lower and their slopes less steep to the southward. In a valley about 10 miles from Iskarri is a settlement (Oshirokots), along the shore between which the coast is a deep sandy beach under high banks; the country inland (to the south-east) being a stretch of low alluvial soil extending right across to the east side of the island. Between Oshirokots and cape Buyimawas a table-land abuts on cliffs of clay and shale.

Hama-maski, is picturesquely situated, midway between cape Buyimawas and cape Kamoieto, at the entrance to a considerable river. A sandy beach extends some distance south of the village to some fishing stations, whence a bold and rocky shore continues to the southward.

CAPE KAMOIETO or OFUWI, is 9 miles northward of cape Buyimawas. On the north side of the cape is a lofty vertical cliff of bright red sandstone, and there are sulphur springs in the neighbourhood. The shore, to about 2 miles west of Maski is precipitous, the mountains rising right up from the sea with only a few gullies; but at that distance it becomes comparatively low.

Maski, is 12 miles north-east of cape Kamoieto; the coast between forming several small bays. A stony beach lined with huts and boat-sheds extends nearly the whole distance.

RUROMOPI, is a considerable settlement 10 miles north-east of Maski, situated in a small bay open to the north-west, into which a deep but narrow river disembogues by a winding entrance; there is a strong bridge over the river. A straggling settlement extends northward nearly all along the coast between Ruromopi and Tomomai, a distance of 22 miles. The country near the sea is covered with grass and bamboo scrub, and the hills inland are wooded.

Obiraspi river, a stream of considerable size, enters the sea about 6 miles north of Ruromopi, and 18 miles south of Tomomai; in its valley (about 24 miles inland) coal of not very good quality has been found.

TOMOMAI, about 18 miles northward of Obiraspi river, and 17 miles south of Furibets, is a comparatively large settlement situated at a bluff point (Shiskoff Pt. of the charts). The inhabitants are thriving and cultivate some gardens. The coast from a short distance south of Wimbets rises, and the shore is skirted by a straight line of yellow cliffs from 200 to 250 feet in height.

Furibets, an old fishing station, is situated between Tomomai and Wimbets (at about 16 miles northward of the former); at a gap in the cliffs there is a small river crossed by a substantial wooden bridge.

YAGISIRI and TARURI islands.—These two islands lying N.W. from Tomomai, are 354 feet and 577 feet in height respectively; there is said to be a small village on one of the islands.

Wimbets river, a stream of considerable size, enters the sea at about 10 miles northward of Furibets, the coast between being sandy beach with low swampy country behind it.

Teshiu river, at about 9 miles north of Wimbets is a considerable stream which runs parallel with the beach for some distance before making its way through a sand spit into the sea. On the south side of its mouth there is a long narrow lagoon also connected to the river. The fishing station stands about a mile south of the river entrance, and is about 25 miles southward of Bakai. In former times good sized junks could enter this river, but it is now almost blocked up; it is, however, navigable for boats for a long distance.

A dreary straight coast, having a flat sandy beach fronting a low country covered with a dense fir forest, extends northward from Teshiu river as far as the high land a little south of Bakai.

Bakai, a fishing station about 13 miles south of cape Nossyab, is recognised by having, on a hummock, (just underneath a hill at the back of the village) a peculiar rock.

Quantities of driftwood are found along the shore, and a monster species of crab is also to be met with about here.*

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* The amount of herrings caught on this coast in spring and early summer is something enormous, providing employment for thousands of people.

CAPE NOSSYAB, the north-west point of Yezo island, is the abrupt but rather sloping termination of a remarkable table land, and appears at a distance like an island. Extending a mile northward from the cape is a flat narrow tongue of land, only a few feet above the sea, having upon it a few huts and a fishing station, which are conspicuous objects before the low land, on which they stand, rises to view, at 5 or 6 miles distant. From the extreme point of this low land a shoal rocky spit, partly covered with weed, extends N.N.W. upwards of a mile, with but little water over it in places; and at its extremity a depth of 2½ fathoms, which rapidly deepens to 6 and 7 fathoms. Heavy breakers sometimes disclose this spit, but in smooth water they do not extend to its outer end. No vessel should approach it within the depth of 12 or 14 fathoms.

Anchorage.—There is anchorage in a bay 6 or 7 miles to the southward, on the west side of cape Nossyab, with the cape bearing N.N.E.; south extreme of land S. by W. ¼ W.; and the summit of Risiri S.W. by W. ½ W., in 12 fathoms, the soundings decreasing gradually. A little farther north the ground is foul, in a less depth than 10 fathoms, at three-quarters of a mile off-shore. The shore abreast this anchorage is low and swampy, covered with long rank grass and weeds, and backed by higher ground terminating in cape Nossyab.

Cape Isya, 8 miles south of cape Nossyab, is another point that much resembles cape Nossyab on coming along the coast from the south, and whose continuation is also a sandy spit; cape Nossyab, however, has a few huts on the sand spit, whereas there are none on the false point. Tide rips are very prevalent along that coast, and extend 2 miles from shore.

The bearing of capes Soya and Nossyab in line is E. by N. ⅓ N. The *Dupleix* rounded these capes, getting 22 fathoms off the extreme of the rocks that terminate them.

RISIRI ISLAND is about 20 miles to the south-west of cape Nossyab, and the passage between (7 miles wide) is quite clear of all known danger, and may safely be taken. This island, from its great height, becomes for vessels approaching from the southward, a conspicuous mark for the west entrance of La Pérouse strait. It is nearly circular in shape, with a generally low shore rising abruptly from the sea. No dangers of any importance are known in its vicinity; a few detached rocks exist, but they lie close inshore. It was first seen by La Pérouse, who took it for a mountain on the mainland of Yezo, and named it Pic de Langle. Its summit attains an elevation of 5,900 feet, and may be seen in clear weather from a distance of 70 or 80 miles; it is generally capped with snow, and often peers out most usefully above the harassing fogs.

Nakko head.—A bluff called Nakko head, about 280 feet in height, jutting out of the north-east side of the island, and faced by a cliff about 100 feet high, forms a small bay; close round Nakko head is a depth of 10 fathoms.

Nakko bay, situated on the north-east side of Risiri, is one mile wide, and a little over half a mile deep, with a depth of from 10 to 12 fathoms at the entrance, decreasing gradually to 3 fathoms within about 2 cables from the shore; the bay affords good protection against all winds from North round by west to S.E.; and from S.E. to East the mainland of Yezo would prevent any considerable sea rising. The *Actæon* anchored in 11 fathoms, sand. Gunboats, or vessels with steam at command, might go farther in, and be more sheltered, in 5 fathoms. The population is very small and they employ themselves in fishing and collecting edible seaweed (Koumbu) which they export in large quantities. The south side of the bay is a table-land about 250 feet in height, thickly wooded, and broken by several small ravines and land-slips; the hills immediately behind, rise one above the other, and terminate in the magnificent Pic de Langle.

There is a landing place at the small village, on the west side of the bay. A very small portion of the island is cultivated, the sides, of the mountain being wooded to the summit; the inhabitants, like the rest of the Japanese islanders, mainly depending upon the products of the ocean for support.

Anchorage.—The holding ground in Nakko bay is good. The best anchorage is in the north-west part of the bay in from 6 to 7 fathoms, and for small vessels, with steam at command, there is good anchorage closer in. The anchorage is particularly useful as a shelter against the westerly gales so prevalent in this part of the sea of Japan.

Supplies.—None can be obtained here. Firewood, however, may be had.

Tides.—Springs rise about 4 feet.

Current.—The current in the vicinity of the islands of Risiri and Refunsiri sets to the north-east at from 1 to 1½ knots an hour.

REFUNSIRI ISLAND, lying off the south side of the western entrance to La Pérouse strait, is in shape an acute-angled triangle 11 miles long, and 3¼ miles wide at the base which is its north end, where there is a shallow bay, with rather a populous village. Its south point, cape Karanunai, is only about 5 miles distant from the north-west shore of Risiri island. A large portion of the island is under cultivation, and it is much more thickly inhabited and productive than its near neighbour, Risiri. A few fowls and some fish may be obtained, but no other supplies except water. The summit of a range of hills, the highest part of which is nearly in the centre of the island, attains an elevation of 1,300 feet, but it is so close to Pic de Langle on Risiri as to appear to the eye much lower.

The shores of this island appear to be clear of outlying dangers, except the north end, where the ground is foul.

Bomasiri islet, lies a mile northward of cape Hieber (the north-west point of Refunsiri island) ; but the channel between it and the point is blocked up by a reef of rocks.

Rock.—Nearly 2 miles north of the north-east point of Refunsiri island, and about 2½ miles East from Bomasiri, is the dangerous rock discovered by H.M.S. *Bittern* in 1855, but it nearly always breaks, and, therefore, in daylight may be avoided.

From the north-west point of Bomasiri a reef extends to the northward fully 4 miles.* Caution is requisite when approaching Refunsiri island.

In September 1859, H.M.S. *Actæon* anchored in 12 fathoms on the east side of Refunsiri, close to a small rocky islet about 4¾ miles north of cape Karanunai (the south point of the island), with the extremes of the island bearing S.S.W. ¼ W. and N. ⅔ E. ; fair shelter being thus afforded from S.W. to N.W., the points between which the autumn gales generally blow with the greatest strength.

Barrick rock, a doubtful danger, is said to be about 11 miles westward of Refunsiri.

ROMANZOV BAY, between capes Nossyab and Soya is an extensive bay, in which the land, covered with rank verdure slopes to the sea margin, and its appearance in the south part or bottom leads to the supposition of a large river being in that direction. Several huts are distributed along the shores of the bay, and about 5 miles S.W. from cape Soya is a large fishing village having near it on an elevated position an earthwork with embrasures, but no guns were seen. The reefs extend a great distance along the shore of the east side of the bay, but not far off the shore. About 2 miles within the bay, on the cape Soya side, the water shoaled suddenly from 12½ to 8 and 2 fathoms on the outer edge of foul ground, extending nearly 2 miles off shore ; a vessel, therefore, intending to take shelter here from a south-east wind, or wait the clearance of fog, should be careful to keep 3 or 4 miles off shore, where there is anchorage for the purpose in 17 or 18 fathoms, but the anchorage is bad in this bay even under favourable circumstances.

CAPE SOYA, the north extreme of Yezo, is wild and barren ; it may be easily recognised by a remarkable white rock lying off it to the westward. Reefs extend off the cape to some distance, and continue along the shore of Romanzov bay.†

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* As the extremity of this reef is only 3 miles southward of the shoal marked P.D. on the chart, it is considered that they may possibly be one and the same.

† It was on these reefs H.M.S. *Rattler* was lost.

Reef.—A reef awash is reported to be situated about 7 or 8 miles E.S.E. of cape Soya.

THE South and East COASTS of YEZO.—At 2½ miles round cape Yesan to the N.W. is a bay which affords good anchorage and shelter during westerly winds, and may often be found of great use and comfort when making for Hakodate, and finding it blowing hard from the westward through the straits; during fog, and when the cape or mountain is obscured, the strong sulphuric steam which descends, and is swept along the water, will frequently be smelt a considerable distance.

UDSUZERI BAY, is on the southern shore of Volcano bay S. ¼ E. from Endermo harbour. It is a small indentation having 3 cables of sheltered space, and shut in from the south by a low point from which rise three conical mounds, that serve as good marks for the recognition of the place. The neighbouring land is high and very steep.

Anchorage may be had in 4½ fathoms, bottom of muddy sand, with good holding ground. There is a heavy sea, with winds from north-west round by north to east. The bay may be recognised by a large conical hill situated at its head.

Tides.—The tide rises from 2 to 3 feet.

VOLCANO BAY.—The United States frigate *Southampton* visited both this bay and Endermo harbour in 1854, and verified the accuracy of Captain Broughton's survey made in September 1796.

The following description of this bay and Endermo harbour is from Broughton's Voyages, pp. 102, 104:—He there states, "I have seen few lands that bear a finer aspect than the northern side of Volcano bay. It presents an agreeable diversity of rising ground, and a most pleasing variety of deciduous trees, shedding at this time their summer foliage."

"The entrance into this extensive bay is formed by the land marking the harbour, which the natives call Endermo, and the south point, which they call Esarmi; they bear from each other N. by W. ½ W., and S. by E. ½ E. distant 33 miles. There are no less than three volcanoes in the bay, which induced me to call it by that name. The depth is 50 fathoms in the centre, and the soundings gradually decrease on the approach to either shore. During our stay at the period of the equinoxes we experienced generally very fine weather, with gentle land and sea winds from N.E. and S.E., and no swell to prevent a vessel riding in safety, even in the bay; and the harbour of Endermo is quite sheltered from all but bad weather, and is the best in the island, being exempt from the sudden and fierce gust of winds which are experienced at Hakodate during a S.W. wind."

MORI ROADS,* on the southern shore at the entrance to Volcano bay, affords anchorage fairly sheltered, except with strong easterly winds, at about 2 cables from the shore in 6 fathoms. There is a breakwater for shelter of native craft abreast the rather large village.

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* *See* Admiralty plan:—Mori roads, No. 993; scale, $m = 2.75$ inches.

Osarubets river, flows through a deep valley cutting into the mountains on the S.E. side of Uszi volcano. On the east side of the river, but at some distance back, is a high range of mountains, the lower slopes of which are dotted with oak, and near the sea is a high terrace. Several streams colored with sulphur come down from these mountains.

The valley of the Osarubets is partially wooded, and both here and westward towards Abuta, there are frequent patches of cultivation. Millet, potatoes, turnips, and other vegetables are grown.

Ribungi, is a small station situated on the shore of a small bay 18 miles north-west from Endermo. The coast from Abuta towards Ribungi is high and rocky, with the exception of the little bay in which the village is situated, surrounded by high mountains.

The COAST, from Ribungi trends to the westward and southward for a distance of about 8 miles, and is a high rocky shore with fine cliffs, pinnacles, and caves, of conglomerate rock.

Oshambe, is a village of some 40 houses and a number of Aino huts, situated on the right bank of a river close to the beach about 10 miles south-west from Ribungi. From Oshambe there is a road across to Otatsuts, and thence to Iwani on the north-west coast of Yezo island. Mount Siribets, probably the highest mountain in Yezo, lies north-east from Oshambe; it is a very fine peak of conical shape, and appears to be an active volcano.

Yulap, is a rather large Aino village, about 15 miles south of Oshambe; thence the coast curves to the south-east to Yamakusanai, distant 5 miles, close to which, in a small valley about a quarter of a mile from the sea, and one mile north of Yamakusanai, is an iron foundry. Iron sand is found in abundance along the shore for miles, as far as Romanotake volcano.

Silver and lead mines are situated in the Yulap valley, about 14 miles from the sea. There are also petroleum springs near Yamakusanai (a long straggling village).

Wasinoke, 11 miles south-east from Yamakusanai, is the largest village on the shores of Volcano bay; it is situated on the top of the cliffs which skirt the coast in the neighbourhood, and contains about 100 houses and some temples. From Wasinoke the volcano of Romanotake bears about E.S.E. and has an imposing appearance. Salmon, herring, iwashi, irico, and skate are caught in the several seasons.

Sinmororan or ENDERMO HARBOUR,* is an indentation on the south-east side of Volcano bay, and is about 3½ miles long and 1½ miles wide at its entrance between Daikoku sima (off the south entrance point) and the shore of the bay on the north. There is also a passage 4 cables wide south of Daikoku sima between it and the reefs off Yetomo saki.

The town of Sinmororan stands at the head of Endermo harbour, and towards the head the shores are low and flat, so much so as to prevent boats landing within one hundred yards; in all other parts wood and water are procured with the utmost convenience. Sinmororan is rising in importance, and there is a road from the village to Sappro, the capital of Yezo island. The chief export is fish and edible seaweed. Coal (of an inferior quality) may be obtained in small quantities, and there is telegraphic communication between the towns of Sinmororan, Sappro, and Hakodate.

A range of hills, 1,800 to 2,000 feet in height, with three remarkable peaks on the highest ridge indicates the situation of this harbour.

Outside the bay the shores are bold, with deep water close up to the rocks. Off the west point of the headland (Yetomo saki) which forms the bay, shoal water extends 3½ cables westward of the small islet which lies off it.

Kiumororan, the village on the north shore at the entrance to Endermo harbour, has a regular service of passage boats between it and Sawara, a village on the southern shore of Volcano bay. Just west of Kiumororan the coast turns abruptly north-by-west towards Uszi volcano with its jagged peaks and steep slopes, situated from 2 to 3 miles from the beach; it has two peaks and a smaller pinnacle, both peaks being active volcanoes.

A vessel may pass in on either side of Daikoku sima. A 5-fathoms patch lies N.W. 6 cables from the N.W. end of this island.

Directions.—Entering Endermo harbour steer to bring Daikoku sima to bear N.E., and then for it, passing northward of the island at about 2 cables distance. When Daikoku sima bears South alter course to E. ½ S. until the lighthouse on the western shore of the harbour bears South, when steer S. by E. ½ E. for the bluff at the head of the harbour.

Anchorage may be obtained as requisite, in from 3¾ to 5 fathoms, perfectly sheltered.

Tides.—It is high water, full and change, in Endermo harbour, at 4h. 35m.; springs rise 5 feet.

Light.—On a point on the western shore of the harbour is a small square tower, from which is exhibited at about 35 feet above the sea a *fixed* white light.

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* *See* Admiralty plan:—Endermo harbour, No. 993; scale, *m* = 2·5 inches.

YUBETS, a rather large village, is situated on the beach at the entrance to the river of the same name about 35 miles eastward of Endermo harbour, and 80 miles westward of cape Yerimo; it was formerly the chief station of the district, embracing Saru to the eastward and Taromai to the west, and extending inland to the stations on the upper waters of the Iskarri river. The principal products are salmon, inashikass, oil, deer-skins and horns. The number of deer in this part of the country (in the Iskarri valley) during autumn and winter is enormous. Taromai volcano, now extinct, is situated some 12 miles westward of Yubets; the country between is flat and swampy with some meadow land, the soil volcanic sand and gravel. From Porobets, 10 miles east of Endermo, the country is the same, but the high lands are farther inland. A bold headland terminates this stretch of flat, and thence to Endermo the country is broken, being a succession of hills wooded with oak, and intervening valleys.

URAKAWA BAY,[*] about 30 miles north-west from cape Yerimo, is an open anchorage, protected, however, from the south-east by a reef extending some distance from the shore. Reefs and rocky patches also extend off shore northward of the anchorage, and great caution is required if intending to anchor here off the small village which stands on a sandy point at the foot of the hills.

CAPE YERIMO.—In lat. 41° 56′ N., long. 143° 16′ E., is a rocky ragged bluff, about 80 feet high, the south extreme of a piece of plateau country, which stretches from the high mountains inland to the sea. There are several remarkable pinnacle rocks close off the cape, about 30 feet in height; and a reef of bold rocks, 10 or 15 feet above water, extends off S.E. $\frac{5}{8}$ of a mile: a depth of 11 fathoms was obtained close off the extreme, and along the S.W. edge of the reef 6 and 8 fathoms; this depth gradually increases to 20 fathoms one mile off the cape. There are several villages, containing storehouses for fish and seaweed, under the cape.

Numbers of sea lions are found on these rocks; their roaring can be heard a considerable distance. The coast trends to the northward on the east side of cape for some way, gradually hauling to N.E. On the west side the trend is N.W.

Immediately behind this cape is a range of mountains, about 3,500 feet in height, which will be seen from a considerable distance, when approaching.

Giving cape Yerimo and the extreme S.E. rock a berth of half a mile clears all dangers.

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[*] *See* Admiralty plan:—Urakawa bay, No. 993; scale *m* = 4 inches.

The COAST between cape Yerimo and Akishi, a distance of nearly 90 miles, stretches about N.E. from the cape, slightly curving back, then trending more to the eastward, with not even an indentation along it. Junks anchor, during a westerly wind, a little to the north of cape Yerimo.

KUSURI, a Japanese settlement 20 miles west of Akishi, is situated at the mouth of a river, and consists of about 500 Japanese and a rather greater number of Ainos; fish and seaweed, being the produce of the place.

Anchorage.—A vessel can anchor off the settlement if the wind is off shore, or between N.W. and N.E., but not otherwise.

AKISHI BAY.*—The land in the vicinity of this bay is (in appearance) perfectly flat and level; in height about 250 feet. The country around Akishi is pretty thickly wooded with deciduous trees (oak, maple, willow); where devoid of woods the hills are usually covered with a dense growth of scrub bamboo, to several feet in height. On the lower ground high grass grows luxuriantly. Two remarkable high mountains are seen in a N.W. direction, the easternmost one being in the form of a sugar-loaf with the top broken off; the left is a clump of peaks, with one standing clear by itself from the west end of the clump. Other high mountains are seen in the distance, bearing about N. by E., but these are really on cape Sirotoko, which is fully 60 miles off.

The Japanese have a settlement at this place, consisting according to the statement of the head official, of 40 Japanese and 160 Ainos. Fish of numerous kinds, salmon, herring, flat fish, and a very white silvery fresh-water fish, about 10 inches long, abound. The salmon do not come into season until August and September.

Some of the fish are dried, but the greater portion are boiled down for manure, which is sent south. Akishi is one of the principal places from which the edible seaweed of the best kind is obtained. Seaweed cutting and drying commences in July, lasting three months, during which time fishing is almost suspended; this article† forms one of the greatest exports both for the Japanese and China markets from Yezo. Junks bring provisions during the summer, and overland there is a path to Hakodate, which place can be reached in about 17 to 20 days.

Lagoon and River.—At the head of the bay is a large lagoon, with a good sized river running into it; the lagoon is very shallow, being almost dry at low water. The river is pretty rapid, and comes from the N.W. Oysters abound in the lagoon, also other shell-fish, and numerous species of water birds, waders and divers, congregate in great numbers over this locality so well adapted for them.

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* *See* Admiralty plan:—Akishi bay, No 992; scale, $m = 2 \cdot 0$ inches.

† In its fresh state the weed is much like Kelp, and is in lengths of from 20 to 40 feet.

Daikoku sima, just at the entrance to Akishi bay, is conspicuous and easily distinguished on approaching from any direction. The island is bold and rocky, its north end being 370 feet in height, and stands out from the land to the southward; the west point has a few rocks studded off it, but they lie within a distance of 2 cables.

Ko Daikoku sima, a small islet, 95 feet high, 7 cables to the north-north-east of Daikoku is said to be rapidly decreasing in size, as the sea is gradually washing away the soft slaty shale of which it is composed. From this islet the best edible seaweed is obtained. Both Daikoku islands are joined to the mainland by a reef, and would appear to have at one time formed part of it.

Between the west point of Daikoku sima and cape Tempotze (290 feet high) the western boundary to the bay, a distance of 3½ miles, there is a clear passage of 1½ miles in width, between the rocks which extend 2 cables off the south and west points of Daikoku sima and the east end of a reef, which extends from cape Tempotze in an E. ½ S. direction towards the island, to a distance of 2 miles. There is deep water on either side of this reef, which, however, ought to be given a wide berth; generally there is a swell rolling in from the S.E. or South, which, breaking over the reef, points out its position and extent. From the eastern end of the reef, Conspicuous bluff (250 feet high at the head of the bay on its eastern side), bears N. ¼ E.

There is no passage between Daikoku sima and Ko-daikoku sima; neither between the latter and mainland, the whole being connected by reefs on which the sea breaks.

A few rocks lie half a mile off Flat bluff (260 feet high and immediately south of Conspicuous bluff) and the western shore of the bay is shoal for 1¼ miles from it.

Rocky shoal.—A reef of rocks half a mile in extent (N.N.W. and S.S.E.) and one quarter of a mile broad, and which dry at low water, lie just northward of the centre of the bay; with Conspicuous bluff bearing East distant 2$\frac{1}{10}$ miles.

Supplies.—Water is abundant; and wood with the trouble of cutting it. Nothing but fish can be had at this very insignificant settlement.

Tides.—It is high water, full and change, at Akishi bay at 6h. 30m.; springs rise 5 feet.

Directions.—Keep Daikoku sima on the starboard hand half a mile distant, and steer N.N.W. for a steep bluff at the head of the bay, from abreast the south point of that island.

The water shoals gradually from 14 to 3½ fathoms, which depth will be found due West of another steep bluff, on the east shore, just over the settlement, a distance of 5½ miles.

Approaching Akishi bay from the eastward keep the south point of Daikoku sima bearing northward of N.E. by E. ½ E. until Conspicuous bluff bears west of N. ¼ E.; or if coming from the eastward, round the south side of Daikoku sima at about half a mile distant, and when it bears East (if proceeding to the anchorage in north-eastern part of the bay) steer N. by W. ½ W. until abreast of Conspicuous bluff, when alter course to North for the anchorage.

If intending to anchor on the west side of the bay:—after passing the east end of the dangerous reef continue towards Conspicuous bluff, bearing westward of N. ¼ E. until the south end of Daikoku sima bears E. by S. ¼ S., when alter course to W. by N. ¼ N. Keeping that point on astern, will lead to the anchorage in 5 fathoms. When inside the entrance there is no danger to be avoided, if proceeding to the anchorage west of Ko-Daikoku sima.

Anchorage.—A convenient anchorage, in fine weather, will be found just inside the entrance, north of Daikoku sima, off the flat pebbled point of the island, in 7 fathoms; with the centre of Ko Daikoku sima bearing East, and the south end of Daikoku sima S. ¼ E.

With winds from S.E. the best anchorage is in the north-eastern part of the bay, in about 4 fathoms, mud bottom; with the north end of Daikoku sima in line with Conspicuous bluff point bearing S.S.E. ¾ E., and the south point of the lagoon bearing N.E. by E. ½ E. North and north-eastward of this position the water is much shoaler.

Akishi bay is open to winds from the southward, and during S.W. gales or winds, the best anchorage is in the S.W. bight of the bay north of Tempotze saki, where the water shoals gradually. A good berth is in 5 fathoms at 7 cables from the shore, with Tempotze saki bearing S.S.E. and the north extreme of Daikoku sima East.

Pinnacle rock.—Approaching Akishi bay, a remarkable pinnacle rock, 7½ miles E.N.E. of Daikoku sima, will very probably be first seen; it stands just clear of a bluff point, and is about 80 feet high, the point being about 160 feet in height.

The COAST.—The country from a little to the westward of Akishi is to all appearance perfectly flat, is in its wildest, most tangled state, and quite impenetrable. Trees of all ages lie heaped on the ground covered with moss and lichens of long growth, and in places there are extensive lagoons and swamps, the latter being overgrown with rank strong reeds and hazel shrubs. From Akishi bay eastward, the land tables gradually down, until it disappears altogether in the eastern horizon: at 7½ miles E.N.E. of Daikoku sima, is the above-mentioned pinnacle rock, it is the only remarkable point along this stretch of uniform coast, and is also conspicuous when approaching from the eastward or making Hamanaka anchorage. The trend of the coast from Akishi to Pinnacle rock is E.N.E., and from the latter to Hamanaka or Kiritappu is N.E. by E. 6 miles; the shores terminate in broken cliffs (or bluffs), of dark conglomerate rock, with green dips in the land between, backed by (in appearance) table land, which is covered with woods of deciduous trees, intermixed with fir, and where there is no wood, or the country appears open, in patches of bamboo grass. This constitutes the description of the island, from Akishi eastward, and round cape Noyshaf to Nemero. No dangers were observed at one mile off the shore, neither are there any believed to exist. The colour of the sea is neither blue nor green, such as the hot and cold streams usually are, but has a brownish tint.

HAMANAKA BAY,* in lat. 43° 5′ N., is shallow, but it is a safe anchorage for a small vessel. An island, Kiritappu sima, gives shelter behind it, and forms the anchorage at this settlement. It is open to the eastward only, and owing to shoal water and reefs, which extend across the eastern part, no sea can possibly be felt from this direction. Hamanaka is a great fishing district, and it contains a larger population of both Japanese and Ainos than Akishi. The village is situated on the low north-west point of Kiritappu island. After the fishing season is over, most of the fishermen and Ainos leave, a few only remaining during winter; when they are employed in cutting and hauling firewood, of which large quantities are requisite for the fishing season.

Facing the bay are islets Shiro iwa and Kuro iwa connected by reefs.

Directions.—The best entrance is between the rocks above water, extending off east from the point of Kiritappu island, and the west extreme of the reef from Kuro iwa, which is about 10 feet above water; this passage is about three-quarters of a mile in width, and has not less than 8 fathoms water, with 12 fathoms in mid-channel; just before entering 7 fathoms will be passed over, probably an extension of the rocky island point.

Anchorage.—After having entered mid-channel; round the island half a mile off, anchoring at three-quarters of a mile off the village on the low flat N.W. point of Kiritappu island, in from 3½ to 5 fathoms.

The COAST.—From Hamanaka to cape Usu, 16 miles E. ½ N., the coast slightly trending back from the latter cape, is tabled, unremarkable, and gradually lowering eastward. Reefs and dangers are believed to exist two miles off the coast, probably extending the whole distance from Hamanaka to the cape; it therefore ought not to be approached nearer than 2½ or 3 miles.

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* *See* Admiralty plan :—Hamanaka bay, No. 991; scale, *m* = 2·2 inches.

Ururi sima.—Two islands, 4 to 5 miles N.E. from cape Usu, the largest named Ururi, afford shelter behind them for junks during southerly gales.

CAPE USU, is in about lat. 43° 10′ N., long. 145° 32′ E. The coast from cape Usu to cape Noyshaf, the east extreme of Yezo, trends about N.E. by N. a distance of 18 miles, still gradually lowering most uniformly, and terminating in the cape itself, which is about 40 feet high. The aspect of the country between these capes is the same, except that there are larger patches of ground which are covered only with rank bamboo grass. Where trees are seen they are very much stunted, and twisted, and weather-beaten in appearance. There are bays and indentations along this stretch of coast.

CAPE NOYSHAF, in about lat. 43° 27′ N., long. 145° 50½′ E., should be approached with the greatest caution, as reefs extend on its south side to a distance of from 2½ to 3 miles, showing only during a southerly swell. There is a hexagonal wooden beacon on the cape, 35 feet in height, from which a light is exhibited.

From the numerous islands which lie east of the cape, reefs and rocks crop up in every direction towards the cape, narrowing the passage or channel round Noyshaf to about 2 miles in width.

LIGHT.—From an hexagonal, white, wooden lighthouse 35 feet high, on the eastern extreme of cape Noyshaf, elevated 74 feet above the sea, is exhibited a *fixed* white light; visible from seaward in clear weather, between the bearings of N.N.E. and E. by S. ½ S. from a distance of about 10 miles.

Fog Signal.—During thick or foggy weather, a bell worked by machinery will be sounded *twelve times* every minute, except during the month of February, when cape Noyshaf light will not be exhibited.

Mujoto rock, a dangerous rock, lies 1 8/10 miles S. ¾ E. from cape Noyshaf lighthouse.

Hana bay,* about 15 miles to the south-westward of cape Noyshaf, is about a mile wide between its entrance points, and half a mile deep, and affords good shelter from W.S.W. round by north to East. There is anchorage 3 cables westward of Hana saki, the east point of the bay, in 6 fathoms; the bottom being of brown sand, except near the bluffs where it is rocky.

ISLANDS off CAPE NOYSHAF.—The islands off Noyshaf are 11 in number, viz., Skotan, a large high island 50 miles east from the cape; Taroko, Taka sima or Sibutts, and Shisha sima forming the northern line; Itasiheiso, Mourika, Sarakara, and Akiro, the southern line; with Kotaka sima or Yurum lying midway between Akiro and Shisha, which are the two nearest to the cape. The remaining two are only rocks.

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* *See* Admiralty plan:—Hana bay on sheet No. 991; scale $m = 3 \cdot 0$ inches.

Of all these eleven islands only Skotan and Sibutts have a few Japanese settlers on them, and a more barren desolate part of the world to inhabit could scarcely be found.

GO-YO-MAI STRAIT.—Numerous reefs and rocks, (with a clear channel between the most western reef and the cape, 1¾ miles in width,) lie off Noyshaf, stretching eastward towards the islands.

Different species of sea gulls and seals are numerous.

Directions.—If wishing to make cape Noyshaf, and proceed through the dangerous pass (Go yo mai strait) leading into Yezo strait, the safest course to observe is, firstly, make Akiro sima, the most southern and most western of the group of islands off the cape; it is flat, about 40 feet in height, and except under very favourable circumstances, can be seen at no great distance; no dangers are believed to exist 2 miles off its south side.

If approaching from the south-west, steer N.E. ½ N. from cape Usu and as soon as Noyshaf bears N.N.W., and south point of Akiro sima N.E. by E. ½ E., alter course to N.N.W. to pass the cape not nearer than half a mile. If Kunashir island is seen, a sharp peak near its south-western extreme will now be just open of Noyshaf. There are from 20 to 30 fathoms through this channel.

The Sora-kara rocks to the eastward (towards the islands), when passing appear close-to, with strong tide rips and whirls off and around them.

As soon as the cape is passed, keep the coast of Yezo one mile distant. If proceeding to Nemoro; a sharp point 8 miles west of Noyshaf, with a rock lying two cables off it, will be passed.

As soon as this point is abeam, Namow island opens, bearing S.W. by S., distant 5 miles, and can at once be distinguished by a temple and beacon on it.

If proceeding through these straits N.W. ½ W. from cape Noyshaf to Notske, a curious sandy hook-shaped spit (running out from the Yezo coast, distant 24 miles from Noyshaf), should be passed at one mile, at which distance from the spit is the deepest channel.

The dangers off cape Noyshaf, and the group of islands mixed up, as they are, with reefs and rocks, besides those extending some miles off the cape itself (particularly to the southward), cause this narrow pass round the cape to be most dangerous, and fogs coming on suddenly add much to the difficulty and danger of navigating the strait. If a vessel once gets within the reefs in making for the pass, and becomes entangled in fog and bad weather, she is placed at once in imminent danger. The currents also are strong, and whirl round cape Noyshaf and among the reefs. The channel therefore between the islands of Skotan and Taroko, which is apparently clear of danger, is recommended in preference.

WALVIS BAY. — The coast from Noyshaf trends West 8 miles to the sharp rocky point above mentioned, from which it takes a S.W. by S. direction 5 miles to Nemoro, and is unremarkable the whole distance.

From Nemoro for 5 miles the trend is the same (S.W. by S.), the coast hen dips round a low rocky point to the South, gradually rounding to West, N.W., and North, which is its trend at Nishibets, the next Japanese settlement westward of Nemoro; and this continues on to the curious hook-shaped spit of Notske, situated 8 miles N. by W. from Nishibets. The large bight so formed has a depth of not more than 16 fathoms in it, and is known as Walvis bay.

From cape Noyshaf until the coast dips to the South, the country is similar, dark rocky points, low cliffs, and stony beaches, and deciduous trees; bamboo grass covering the ground.

NEMORO,* the only place on the north-east coast of Yezo with any pretensions to an anchorage, is in lat. 43° 20⅛′ N., and is formed by a small island, Benten sima, lying across a bay, and thus affording fair shelter for one vessel of light draught. In the entrance midway between the island and point (which is 2 cables wide), there is a depth of 6 fathoms, shoaling rapidly to 4 fathoms.

The most sheltered part of this bay is shoal; the usual anchorage for junks being close to the island, with hawsers made fast to the rocks.

LIGHT.—From a white staff 40 feet in height, situated on the north-east point of Ben-ten sima, and at an elevation of 75 feet above the sea, is exhibited (except during the month of February) a *fixed red* light, which should be seen in clear weather, from a distance of about 6 miles.

Supplies.—Wood, water, and fish are plentiful.

The land about Nemoro is not more than 100 feet in height; as soon as it dips to the southward the aspect of the country entirely changes; a mass of swamps and shallow logoons back the stony beach, opening here and there into the sea; fir trees become more thickly mixed with oak, hazel, &c.

The rocky points and cliffs are now replaced by a continuous dark pebbled beach.

Nishibets river, is a very important salmon river, 9 miles south of Notske bay. Between Nemoro and Nishibets are several fishing stations worked during the season by Ainos from Share and Mombets, who return to their homes during the winter. Though a very small river, being only

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* *See* Admiralty plan:—Nemoro anchorage on sheet No. 991; scale, $m=4\cdot0$ inches.

30 yards wide at its entrance, the annual catch of salmon in the Nishibets river is enormous. In 1869 not less than 1,000 tons of salmon were exported to Japan.

NOTSKE BAY* and SPIT, in lat. 43° 33′ N., is a low and flat tongue of land shaped like a hook, projecting from the main land of Yezo about 6 miles. Its north side (a steep shingle beach) trends in a S.E. direction, rounding to the south and west; and on this side of the spit (south) there are open shallow bays where only boats can float. Fir trees and oak appear to flourish on this strange sandy spit. The Japanese have established a fishing station on it; and there is a small temple on its extreme S.E. edge. In the neighbourhood of Notske are several rivers, the shore being of a soft oozy nature with lagoons and swamps extending some distance inland.

Anchorage.—The anchorage off Notske affords shelter from winds from the westward, but is open to the east.

SHIBETS, 11 miles from Notske by sea, is a considerable fishing station (herring, salmon, sea trout) situated at the entrance to a good sized river. Besides the principal dwelling houses, there are quarters for officials, store-houses carpenters shops, and other buildings, with a collection of Aino huts adjoining. The anchorage off this settlement is open to the N.E., and but little wind from that quarter, or East, produces a nasty sea. The country is very low and flat until past Shibets, from whence it rises suddenly into a grand lofty range of mountains, which terminate in cape Sirotoko.

CAPE SIROTOKO.—The N.E. extreme of Yezo is in lat. 44° 18′ N., long. 145° 23′ E. The high range of mountains which form this cape terminate abruptly a little back from the extreme point.

There are two projecting and remarkable points on the cape, one forming the eastern extreme, the other the northern. The latter has at 2 cables off it, a rock about 30 feet high, by which it can be easily distinguished.

YEZO STRAIT, separating the north-east coast of Yezo from the island of Kunashir, is about 20 miles wide at either entrance, narrowing to 9 miles off Notske bay; at which place a shoal ridge having 10 fathoms deepest water extends across the strait to Kunashir. The entrance from the eastward is shoal, 16 fathoms being the deepest water, but the western approach is deep, the coast of Yezo being steep-to. As soon as Shibets is abeam, bearing West, the water deepens quickly, and following the Yezo coast up, it continues to do so, and 40 and 50 fathoms will be found close along the coast; great caution is necessary when proceeding through these straits, sudden patches of shoal water being frequent. The straits between S.W. point of Kunashir island and Notske spit show an irregular bottom, starting with 4 fathoms off the point, deepening to 6, shoaling again to 4, and again deepening to 11 fathoms at 1½ miles off Notske spit; at which distance, probably, the best channel runs through the straits.

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* *See* Admiralty plan:—Notske anchorage, on sheet No. 991; scale, $m = 1 \cdot 7$ inches.

Ice.—In December the strait is frozen over to a considerable distance off shore.

The NORTH COAST of YEZO, has a length of about 200 miles between capes Sirotoko and Soya, and with the exception of about 35 miles which trends to the south-west, into Share bay, may be said to have a general south-east and north-west direction. Its prominent features are, a high mountainous district near cape Sirotoko; a low shore skirted with numerous lagoons and swamps westward of Share; a high bluff near Yessasi; and thence towards Soya a comparatively low fir-wooded country. There is a total want of harbours along its entire length, and though, doubtless, there is anchorage off all the small fishing stations, no detailed survey has been made, and no positive information has been obtained on this point.

The trend of the coast after rounding Sirotoko is S.W. ¼ S. for 37 miles, when it rounds to W. ½ N. for 18 miles further, here it suddenly trends N. by W. for 10 miles, forming a point called cape Notoro, the bay between these points being known as Share bay, so called from a settlement of that name situated at its head.

SHARE BAY, formed on the east by the high promontory of which cape Sirotoko is the extreme, is open to all winds from N.E. to N.W. The village of Share is situated on the northern bank of a river (of tolerable size), where taking a considerable bend to the south-east it flows into the sea over a shallow entrance. On a sand ridge immediately above the principal buildings, is a small temple together with some store-houses and Aino huts, most of the latter, however, are some little distance to the eastward. The shores of Share bay (at the head) are composed of soft coarse sand; to the east the country and coast are alike mountainous, the latter becoming steep and rocky towards cape Sirotoko. There is said to be an extensive bed of pure sulphur near the sea between Share and the cape. Inland, bearing S. ½ E. from Share, is a high double peaked mountain appearing detached from the great mass to the eastward.

The coast westward from Share is a sandy beach backed by sand hills, through which are several outlets to lagoons; about 5 miles south of Abashira the coast trends to the north-west with a sandy beach and wooded high land rising abruptly from it, forming two small bays, in which are rocky boulders; and on the shore are small fishing stations. In the northern bay is a very peculiar cliff of grey stone rent in quadrilateral blocks having much the appearance of basalt. Some portions are of a pink and some of a yellow colour, and it is the resort of numerous sea birds, the white dung of which causes it to be conspicuous from seaward.

ABASHIRA, about 20 miles north-westward of Share, is a similar collection of buildings to that found usually at the larger fishing stations. The settlement, containing in 1871 about 150 Japanese and Ainos, is situated on the south shore of the bay, close to the embouchure of a considerable river, which flows out of a lake a short distance inland. Fronting the village is a curious reef of rocks, with a high mass of light stone and rock at one end of the reef.

Anchorage in 5 fathoms may be had here on either side of the reef. A bank on which is a depth of 1½ fathoms extends from the reef to the entrance of the river. As long as the wind is off shore the anchorage is safe, but with the wind from the northward and eastward there is no shelter, and the sea gets up quickly.

Cape Sirotoko can be distinctly seen from here on a clear day, bearing E.N.E.

The country near Abashira is of moderate height, 500 or 600 feet, but unremarkable, except that large lagoons and shallow inlets of the sea are found in its vicinity. There is no cultivation, the country being entirely covered with wood, principally deciduous trees of good size.

A sudden dip in the hills, and which is the course of the river through them, will be observed when approaching from the east.

Cape Notoro.— From Abashira the coast trends northward for about 5 miles to cape Notoro.

Tokoro, a small fishing station at the mouth of a river of considerable size, is about 12 miles westward of cape Notoro. The coast is composed of conglomerate cliffs, and inland is well wooded, and in parts swampy. A lagoon of considerable size, midway between cape Notoro and Tokoro, extends in a south south-west direction with high mountains beyond, apparently from 20 to 30 distant.

Saru-ma lagoon.—About two miles westward of Tokoro is the outlet of the most extensive lagoon on the whole coast. The water of the lagoon is salt, and there is a rise of tide within it of about 2 feet; it contains large oyster beds. Saru-ma lagoon is about 3 miles broad and 14 miles long, lying parallel with the shore, between which there is only a ridge of sand hills, covered in some parts with a dense scrub of small oak.

Yubets, a small fishing station a short distance westward of the extreme west end of the lagoon, is situated in a swampy district on the bank of a river which forces itself through a soft sandy beach into the sea;

and being obstructed at its mouth by a bar, is available only for fishing boats. The buildings consist of only 2 houses and a few Ainos huts.

The COAST, westward as far as Mombets is low and swampy, with a sandy foreshore, behind which are several small lagoons. A small deep stream, at the mouth of which is a quicksand, lies immediately south-east of Mombets.

MOMBETS.—From cape Notoro the coast trends N.W. by W. ½ W. for 44 miles; here a low point projects out one mile from the otherwise uniform coast line; just inside the slight protection this point gives, is the settlement of Mombets. With the wind off shore a vessel can anchor one mile off the settlement in 5 fathoms.

Mombets is the head-quarters of the district, and stands on a sloping rocky point, which extending into the sea, forms a reef affording some little shelter to the small bay, which is only about one-third of a mile deep.

Ice.—In winter the sea along the northern shores of Yezo is said to be frozen for a distance of 6 or 8 miles out; but La Pérouse strait remains open in consequence of the high temperature of the water of the Kuro Siwo, which passes from the Japan sea into the sea of Okhotsk. The ice is principally blown, by the prevailing northerly winds of the winter, from the Saghalin coast on to the north-east coast of Yezo island.

The COAST from Mombets to Soya, a distance of 90 miles, trends about N.W. by N. The whole of the N.E. coast of Yezo, from Sirotoko to Soya, is low, with higher ground and ranges of hills rising inland. The country is covered with wood and long grass.

Sawaki, is a small fishing station about 20 miles north-west from Mombets. The coast between is fronted by a sandy beach, low, and covered with grass and bamboo scrub, and oak; and on the higher mountains inland are thick forests of fir. A few small lagoons and swamps intervene in places, between the beach and the hills, while the country inland is mountainous. There are three rivers, with quicksands at their entrance, between Mombets and Sawaki.

The COAST north-west from Sawaki assumes a different character to that to the eastward, being irregular and rocky, broken up into small bays with rocky points between, and is skirted by reefs of rock. Some small rapid mountain streams occur at intervals, but there are no lagoons.

Horonai, another small fishing station (salmon) at the entrance to a small river, is situated about 12 miles north-west from Sawaki; there are but few fishermen here.

Chuskiu islet, lies about one mile from the shore, at from 3 to 4 miles north-west of Horonai.

The COAST from Horonai towards Yessasi rises in terraces or small plateaus towards the hills, which are scooped in low cliffs along the shore, exposing rock, clay, and gravel beds.

Chikatomushi.—Towards Chikatomushi (another small fishing station) granite and other primary rocks are met with. The woods here are composed of beech, alder, maple, and silver fir (todo). The creeks are teeming with salmon.

Along this stretch of coast, nearly 200 miles in length, there is no shelter for a vessel, or anchorage, except with the wind off shore.

LA PÉROUSE STRAIT.

LA PÉROUSE STRAIT, is formed between cape Notoro, the southern end of Saghalin island; and cape Soya, the north extreme of Yezo. The general soundings in it are from 35 to 40 fathoms and upwards, decreasing to 25 and 20 fathoms as the shores are neared; but as these latter depths will be found in the middle of the strait near the Dangerous rock, and in other places the lead in thick weather cannot always be trusted to ensure safety.*

There are heavy overfalls, giving the appearance of a reef, between cape Notoro and Kamen Opasnostoi (Dangerous rock), but deep water was found on passing through. Neither this cape nor cape Nossyab should be closed by a sailing vessel, without a commanding breeze, on account of the tide race off them. (For winds and currents, *see* page 29.)

Tides.—The tides set east (flood stream) and west through the strait, attaining at spring tides a velocity of from 4 to 5 knots an hour.

SAGHALIN ISLAND.

SAGHALIN ISLAND,† Tarakai of the natives, and Karafuto of the Japanese, now a Russian colony, extends nearly north and south abreast the coast of Tartary, for a length of 510 miles, by a width varying from 25 to 100 miles. Its northern portion is opposite the entrance of the Amùr river, to which it approaches within 10 miles, while its southern extremes, capes Siretoko and Notoro, are separated from the island of Yezo by La Pérouse strait.

The island is mountainous, some of the peaks attaining an altitude of over 2,000 feet.

The majority of the mountains are covered from foot to summit by thick forests (mostly a species of maple), but some of the highest peaks have bare rocky summits covered with brushwood. Although the climate is very severe the summits are never covered with perpetual snow; in the northern part of the island as far as lat. 50° N., the range forms in rocky peaks; to the southward of this the hills spread out and slope gradually towards both east and west coasts; two ranges extend respectively N.W. and N.E. from its southern extremes, and meet in Bernizet peak in 47° 33′ N. Mount Tiara stands out prominently on the eastern range, the western range stretching far to the southward is the main chain, and though sloping gently towards the interior, it presents a steep slope towards the Strait of Tartary. Southward of the river Poronai this range is the only one and extends with more or less elevation to cape Notoro, where it falls abruptly into the sea as a rocky peninsula, the extreme point of the cape being separated from the peninsula by a saddle. The greatest depression in the range is in lat. 48° N. in the vicinity of Kosounai, the narrowest part of the island. The highest peaks in the southern part of Saghalin are Tiara (4,000 feet), Koshka, and Bernizet. South of lat. 47° 20′ N., and eastward of the principal chain are two others parallel to its ridge which also forms a peninsula terminating in cape Siretoko. Between these two latter ridges is a system of lakes with high banks, and between the first ridge and the principal chain are the courses of the rivers Sousoi, Takoi, and Naibouchi.

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* *See* Admiralty chart:—Kuril Islands, No. 2,405; scale, $m = 0\cdot03$ of an inch.

† The description of Saghalin is principally from the report of Colonel Venuikof.

Its western face is steep and rugged, the cliffs rising to a considerable height, and along the whole of this coast there is not one sheltered anchorage, the Russian ports of Dui, Jonquière bay, &c. being merely open roadsteads; the eastern coast is low and sandy. The middle district of the island is flat and swampy, but to the north hilly and fertile. It is well wooded throughout, and large quantities of timber are exported to Japan for building purposes. The interior of the island consists of a high table land thickly covered with forests of pine. It is not well watered, but the soil is said to be fertile.

Rivers.—The chief rivers are Poronai and Timir, which have their source not far from each other in lat. 50° 40′ N., and flow the former to the southward, the latter to the northward for 106 and 112 miles; they are navigable for boats. The Poronai communicates by a separate branch with lake Taraika, which in its turn is united by a channel with Tarpenia bay.

Lakes.—The principal lakes are Tounaicha (37 square miles), Taraika (28 square miles), Baika (23 square miles), and Taboostchi (15 square miles).

The climate is very severe, the mean temperature in lat. 48° N. being 34°.7. The hottest month, July, has a mean temperature of 62°, while the coldest, January, 14°. The harshness of the climate is increased by its extreme dampness, there being besides fogs, an abundance of rain in summer following the heavy snows of winter.

Products.—Among the natural riches of the island timber is one of the principal. The forests are composed chiefly of Norway spruce-fir, larch, silver fir, pines, but mostly deciduous trees ranging from birch to elm. In the southern part of the island this forest vegetation is arranged in zones, viz., from the level of the sea to 700 feet elevation deciduous trees; from 700 to 1,000 feet conifers; higher to 1,200 feet, birch; and higher still cedars.

There is coal in several parts of Saghalin, and on its west side around Jonquiere bay and Dui it rises to the surface, and is of fair quality. Whales are found on the east and south coasts; salmon and herrings abound, and in the deep bay of Aniwa on the south, into which two large streams fall, the Japanese have established an extensive salmon fishery. Saghalin has long been celebrated for its fisheries. The fish taken on the coasts are exported to Hakodate and Matsumae, and thence sent to all parts of Japan. The largest fishing station in the island is at the head of Patience bay on the east coast. The fishing season commences in April and closes in August. Besides coal, which crops up in every direction, gold, copper, and iron are found in some quantities.

Shelter.—Saghalin has not a single port which may be termed a safe place of refuge, and on account of the severity of its climate little or no agriculture can be carried on. Garden produce, however, is grown and cattle breeding is carried on.

Water is abundant at all parts, and drift wood for fuel is found in large quantities along the western coast.

The population of Saghalin consists of Russians, Japanese, Chinese, Ghiliaks (Tartars), Ainos (from Yezo), Orokaps and some Europeans and Americans, in all about 14,000. The Russians have about 3,000 troops at the various posts for the most part employed as guards to the convicts who work the coal mines. The chief occupation of the natives is fishing and hunting, the chief articles of export being fish and furs (otter, fox, sable, bear, deer, and seal) in which there is a large traffic carried on.

The northern portion of the island is inhabited by Ghiliaks, and the southern by Ainos. The Ghiliaks are good seaman, hunters and fishermen, altogether there are about 3,000 on the island. The Orokaps are a tribe living in the mountainous parts of the island, and do not number perhaps over 500.

Kamen Opasnosti (Dangerous rock), lies 8½ miles S.E. ½ S. from the summit of cape Notoro, is a small bare rock about 20 feet high and 60 feet diameter, and is frequented by numerous sea lions. It should not be approached nearer than a mile, as dangerous rocky ledges appear to extend from it in three different directions, N.W., E.S.E., and W.S.W. Between the cape and the rock the depths are irregular, varying from 17 to 32 fathoms, the bottom chiefly of broken coral.

The lead here will afford but little warning, but that little should not be despised; less water than 20 fathoms when in its vicinity indicates close proximity. The rock is generally covered with seals, and the noise of their barking and bellowing, if carefully listened for, may in foggy weather warn the seaman of his danger.

CAPE NOTORO (Krilon), the south point of Saghalin, when first seen from a distance of 10 or 12 miles looks like an island. On its summit, 124 feet high, is a small shrine, and 4 miles north of the cape is a conspicuous hill (Quoin hill), which rises abruptly from the shore, but slopes gently towards the cape, and on its north side reaches an elevation of 1,025 feet. A range of hills, varying from 800 to 1,200 feet in height, amongst which is one of sugar-loaf form, stretches along the coast to the N.E. of Quoin hill. These hills are covered with a thick undergrowth of dwarf bamboo, giving them a fresh green appearance, but rendering the country almost impassable. A line of steep earth cliffs, ranging from 80 to 200 feet in height, run along the back of the beach, which is generally a narrow strip of sand.

LIGHT.—From a lighthouse 30 feet high, situated on cape Notoro, is exhibited a fixed light which shows white seaward between the bearings of S.E. ½ S. and N.N.W. ¼ W. (westerly); *red* between N.N.W. ¼ W. and N.W. (over Dangerous rock); and white between N.W. and S.W. ¾ W. (nearly).

Fog signal.—A bell and gun for fog signals are established near the light.

The Tishia rock, 72 feet high, conspicuously marks the position of the point of the same name at 8¼ miles N.E. by N. of the summit of cape Notoro. The coast between takes a slight bend, forming an open bay; no rocks exist in it, except quite close inshore; but 2 miles N.N.E. of Tishia point there is a detached reef at three-quarters of a mile off shore. From the Tishia rock the coast trends about N. by E. for some considerable distance, but it has not been examined.

Anchorage may be found in 8 or 12 fathoms anywhere along the coast between cape Notoro and the Tishia rock. The *Actæon* anchored in 15 fathoms, good holding ground, 1½ miles N.E. ½ N. of the summit of the cape, having Tishia rock just open of Tishia point. Good shelter may be obtained here, and also further to the northward in the bight of the bay, from the prevalent autumnal and winter gales, but it is quite open to the southward and eastward. A few Japanese, with Aino attendants, were communicated with, but they had nothing to dispose of.

Reefs of straggling rocks border cape Notoro at the distance of from

2 to 3 cables. The shore north-west of the cape appears to be fringed with rocks, some of them a considerable distance off shore. On the western side and 3 miles northward of the cape, and near a Japanese fishing station, is an extensive patch of dangerous rocks covered at high water; they lie about a mile off shore, with irregular soundings of 3 fathoms within them and 7 fathoms near their outside. No vessel should approach these rocks to a less depth than 12 or 13 fathoms, as then the ground is broken and foul.

Tide race.—A heavy tide race is often met with off cape Notoro.

Water was obtained by H.M.S. *Actæon* in 1859, without much difficulty, at a small stream on the east side, and 2 miles northward of cape Notoro. On the west side, and 6 or 7 miles northward of the cape, is an excellent watering place, used by H.M. squadron in 1855, at a stream running over a bed of sand and gravel into the sea. Anchorage off it should be taken in 10 to 9 fathoms, sand. The soundings decrease gradually towards the shore.

TOTOMOSIRI, an island lying N.W. ¾ W., 44 miles from cape Notoro, is 1,400 feet in height, without the volcanic appearance of Refunsiri or of Risiri. There are three rocks awash lying about a mile off its eastern shore, and another about a mile off its N.E. point.

Water.—There is a spring on Totomosiri, from which whalers are in the habit of watering, but with great difficulty and labour.

CAPE SIRETOKO (Aniwa), the south-east extreme of Saghalin, is a remarkable promontory, the more so from a chain of high mountains near it, stretching away to the northward, between which and the cape is a hollow that gives it the appearance of a saddle. The headland itself is a steep abrupt mass of rocks, quite barren, with a deep inlet at its point.

ANIWA BAY, is an extensive bight, about 45 miles deep, occupying the southern end of Saghalin between capes Notoro and Siretoko, which bear W. ⅛ S. and E. ⅛ N. of each other, and are distant 60 miles.

Kushankotan.—At the head of Aniwa bay is Kushankotan, where there is a settlement, composed of a few wooden houses, also the huts of the natives, which are of the most wretched description. The coast here is moderately high and level, and when first seen has the appearance of chalk cliffs, which continues for about 12 miles to the south-east, when it becomes higher, irregular, and of a dark colour. The Shikawa (salmon river), the largest river in Saghalin, flows into Aniwa bay close to this settlement, and by its numerous tributaries the Ainos keep up a desultory communication with the interior. The bay is free of ice all the year round; in the winter months broken ice is met with but only at a short distance from the coast.

Karsakovsk.*—The point southward of Kushankotan settlement runs out shoal, and, until better known, should not be approached within 2 miles. Karsakovsk, situated on a slight elevation about 3 miles south of Kushankotan, is a Russian military settlement containing a garrison of about 200 men. The buildings include a barrack and a hospital, and the settlement is neatly kept. The flagstaff is conspicuous from the offing.

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* *See* Admiralty plan:—Karsakovsk road, on sheet No. 2,192; scale, $m = 3 \cdot 5$ inches.

Anchorage may be had in 6 fathoms, sand and mud, at about one mile from the beach, with the village of Kushankotan bearing E. by S. ½ S. and cape Isoja S.S.E. ¾ E.*; also in 5 fathoms off Karsakovsk, at about one mile from the shore; the settlement bearing East. Also off the Russian settlement of Karsakovsk in 6 fathoms at three-quarters of a mile from the shore. To the northward of the north point, seen from the anchorage off the village of Kushankotan, a shoal flat fronts a low plain covered with trees, and farther back the land rises in an undulating form to high hills. The shore from Shikawa as far as Chebeshani, consists of low, barren-looking hills, and thence to cape Siretoko extends a long sandy beach, forming the south-west boundary of the extensive plain on which the Russian settlement of Boussie stands. About midway between capes Notoro and Siretoko the depth is 58 fathoms, and the soundings decrease gradually to the anchorage. The western shore of Aniwa bay presents good holding ground in soft mud, shoaling gradually from outside 10 fathoms, outside which the bottom is hard.

Anchorage may also be had at Ourou, on the west side of Aniwa bay, in 10 fathoms at about 2½ miles from the shore, where there are a few fishing huts scattered along the coast. Aniwa bay is open to the southward, but the holding ground in it is good.

Supplies.—Water is plentiful in Aniwa bay, but is of an inferior quality, and difficult to procure. Excellent firewood in any quantity can be obtained from the authorities, but no provisions; there is, however, an abundance of fish. A small kind of salmon weighing about 3 lbs. is taken in large numbers during a few weeks in June and July; herrings earlier in season.

TOBOOTCHI BAY,† on the east shore of Aniwa bay, lat. 46° 29′ N., is a shallow basin having 3 fathoms water in its deepest part. It communicates with Aniwa bay by a narrow channel which is fronted by sand-banks extending a considerable distance from the shore, the depth on the bar at the entrance being 9 feet: two beacons in line on

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* The shoal said to lie S.S.W. from this anchorage was searched for in vain, and its existence was ignored by the Japanese inhabitants at this settlement. It would be advisable, however, to avoid its supposed position until the fact of its non-existence is verified.

† *See* Admiralty plan :—Tobootchi bay on sheet No. 2,405; scale, *m* = 1·7 inches.

Klykoff point bearing E.N.E. lead in. The Russians have formed a settlement at Boussie at the head of this bay, the Japanese having retired to Chebeshani 8 miles northward. Vessels at anchor outside should, in the event of bad weather, make for Kushankotan. The large lakes which lie to the northward of Boussie are joined to each other by streams, communicating with Aniwa bay to the south and the sea of Okhotsk to the north.

Tides.—In and about La Pérouse strait the tides are very irregular are much influenced by prevailing winds, and are felt mostly inshore, round capes Notoro and Nossyab, where they form heavy tide rips and races. It is high water near these capes, full and change, between 10h. and 11h., and the rise is about 6 feet. The flood stream sets to the northward along the west coasts of Yezo and Saghalin, and to the eastward through La Pérouse strait. On the coast of Saghalin the rise is from 6 to 7 feet.

WEST COAST OF SAGHALIN.

THE COAST from cape Notoro, trends nearly due north for 40 miles to Nyassi point, and is from 100 to 150 feet in height, rising to low hills ; at 1½ miles distant from it there are depths of from 20 to 25 fathoms. There are no off-lying dangers along the west coast of Saghalin between cape Notoro and Kosounai, and the water shoaling gradually, a vessel may stand in towards the shore into 5 fathoms.

NEVELSKOI BAY,* between lat. 46° 50′ N. and lat. 47° 10′ N. consists of some 20 small bights, the principal of which is Maucka cove. These bights rarely freeze over. Parallel with the shore lies a reef of rocks with passages between into the bights, in all of which is smooth water.

MAUCKA COVE, (Endungomo) in lat. 47° 3′ N., is of oval shape, about 6 cables in length (east and west) by 3 cables in breadth. It is the head-quarters of a company which has acquired the right to collect seaweed, beche-de-mer, fish, &c., along the coast between cape Notoro and Kosounai bay. The population (in 1880) consisted of a small guard of Russian soldiers, and a few other Europeans, who employ about 700 coolies (Ainos, Koreans, and Chinese). Communication with the east side of Saghalin is kept up by means of dog sledges, which the Ainos are expert in driving. The average depth over Maucka cove is from 4 to 5 fathoms.

The temperature here does not exceed 60° Fah. in summer, and in winter the thermometer has been known to fall 24° below zero.

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* Owing probably to the warmer waters of the branch of the Kuro Siwo (*see* page 6) reaching this shore.

Anchorage.—Maucka cove is said to be the safest anchorage in the south-west part of Saghalin, and there is room to moor a vessel 250 feet in length, and several schooners, but the holding ground is bad, the bottom being rocky, and it is prudent to buoy the anchors. A vessel can lie in the cove during a north-west gale as the reefs off the entrance break the sea.

Directions.—To enter Maucka cove, bring the leading marks (two poles) in line bearing S.E. ½ S., and steer for them. When about half a cable inside the reefs, the points of which will be seen awash, the vessel will be in a convenient position for letting go her first anchor with a view to mooring, which is advisable.

Mount Lopatinsky is an excellent mark serving to point out the locality It rises in a sharp peak, and there is no other hill like it on the west coast southward of Kosounai.

Tides.—The tides are hardly perceptible in Maucka cove, and they are much influenced by the winds. A rise and fall of 2 feet, however, is sometimes experienced.

Supplies.—There is abundance of fine timber (yellow pine, cedar, spruce ash, and oak) in the valleys near Maucka, and spars of any size may be obtained. Wild onions, wood sorrel, and other anti-scorbutics abound. The Europeans grow potatoes and other vegetables, and fruit trees (from Hakodate) have been planted.

Coal crops up about a mile inland, up a valley, and indications of iron also show.

Fresh water can be obtained from a fine mountain stream. Bears, hares, grouse; and in winter, sables, and very fine foxes, are plentiful. Herring cod, salmon, whales, sea-lions, and seals are found on the coast. Flounders can be caught in the cove with hook and line, and in June and July trout are plentiful in the stream southward of the cove.

PORO TOMARI* (Pakumaka), is a similar bight 5 miles to the northward of Maucka cove in lat. 47° 6½′ N.; it has only a narrow entrance, between stony reefs which run parallel with the shore. The coast range is fronted by a shelf or terrace, apparently the sea level of some remote period.

Notoro point, 10 miles northward of Poro Tomari, is triangular in shape, and is one of the most striking points along the whole coast. Mount Lopatinsky (Bernizet), from which the point is a spur, rises conspicuously above the peaks of the neighbouring range.

TOUBOUT (NOTOSAMA) BAY, in lat. 47° 25½′ N., is sheltered from north and south winds by stone reefs, above water. It is

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* *See* Admiralty plan :—Poro Tomari on sheet No. 2,192 ; scale, *m* = 10 inches.

6 cables long, and the same width with depths of from 4 to 6 fathoms over it. A small river (navigable for a boat about 1¼ miles) flows into the bay, near which is a native village. The bay affords shelter for one or two small vessels. The coast for 10 miles northward consists of clay cliffs resembling in height and shape those of the English channel.

The COAST between lat. 47° 52′ N. and lat. 48° 02′ N. forms an open bay 9 miles in width (from Japanese cape to cape Kosounai), named by La Pérouse bay de Langle.* Its shores are low and sandy, affording during calm weather, or off-shore winds, a convenient landing place. Saghalin is here only 15 miles across, and there is communication with the east coast of the island. Two rivers enter the bay (the Naiers and Kosounai), flowing through a valley of drift sand, which has formed in high hills covered with grass.

From cape Otatsu to cape Usu, or Tokori point (lat. 48° 40′ N.) the coast is low and sandy.

KOSOUNAI.†—A Russian settlement in about lat. 48° 0′ N., is situated on a sand-hill on the north side of a small river of the same name about 50 feet wide and 6 feet deep at its entrance. On the south side of this river is a settlement of Aiños. The Russians live in large white log houses which can be seen from some distance seaward. There are three beacons of pyramidal form, 40 feet in height, one on the north cape, one on the south, and one in the centre of the bay. Game, fish (herrings principally), and firewood are plentiful. The water of the river is brackish to a distance of three-quarters of a mile from the entrance. Three miles to the northward there are large quantities of coal found.

Winds. — Strong winds prevail here during the summer months, especially from S.S.W. Violent squalls off shore are also often experienced.

Ice.—The sea does not freeze at Kosounai except to form small flakes on the beach.

RAITSISKA LAKE and RIVER, is 30 miles north of Kosounai. The lake is separated from the sea by an isthmus only 440 yards wide; on the shores of the lake is a native village. The river has from 7 to 10 feet water inside, but on the bar the depth is only 4 feet; the water of both river and lake is brackish.

The COAST northward of Raitsiska, between lat. 48° 35′ N. and lat. 48° 50′ N., is a steep bluff 800 feet high, behind which are high peaks.

Stoukambiss point is easily recognised by a white crescent-shaped patch on the south-west side of a hill inland, which is conspicuous from seaward. Strong eddies and tide rips are met with off this point.

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* Named after M. de Langle, who commanded one of the ships of La Pérouse's expedition.

† *See* Admiralty plan ;—Kosounai roads on sheet No. 2,192; scale, *m* = 8·5 inches.

TZILMETIEV BAY, immediately northward of the high bluff between cape Orloff and cape Tyrol, is about 3 miles wide and one mile deep; and there is a depth of 3½ fathoms at 1½ cables from the shore. The bay is open to N.W. and westerly winds, and is but a very insecure anchorage. Boats find shelter from S.W. winds near cape Orloff, and from N.W. winds in the small bays of Maksutoff and Tschudinoff, in the north part of the bay, between sand banks.

OROKES BAY (Tang Kotan), the Baie d'Estaing of La Pérouse, in lat. 48° 56′ N., affords good anchorage during south-west gales. From the south-west point a reef, partly visible, extends 100 yards to the northward; and from the north point a sandbank extends southward. There is a depth of 6 fathoms at the entrance, decreasing gradually to the head of the bay into which flows a small river; the bottom is black clay and sand, and the bay is open to westerly winds between W.S.W. and North.

In lat. 49° 3½ N. there are stone reefs parallel with the shore, which afford refuge for boats.

Lesoffsky bay, in lat. 49° 15′ N., is immediately north of cape Gavrilov. The shores of the bay are swampy, and there are some lakes in the neighbourhood.

CAPE OROGI (Baranov point), in lat. 49° 23′ N., rises to a height of about 200 feet above the sea, and is backed by a fine grassy slope. The cape is an abutment of the terrace or raised beach, so remarkable along the west coast of Saghalin, and which appears to have been high water mark at some remote period.

NYASSI RIVER, is about 7 miles northward of cape Orogi. The entrance is under a cliff (apparently) on the north side of a valley; and on the beach south of the entrance is a small village. On the bar is a depth of 6 to 7 feet, and there is 15 to 20 feet water inside. Good fishing may be had here with the seine, between the village and the river entrance.

Caution.—Great care must be observed when anchoring off Nyassi river, and to the northward, as the bottom is rocky, and the depths are very irregular.

SOKKOTA or SERTUNAI.—A small Russian post, 2½ miles northward of Nyassi river—situated in a ravine, through which a small stream flows—consists only of one substantial wooden house and a few miserable huts. The coal mines were here worked by convicts, but were in 1874 at a stand-still, though large quantities of coal were stacked in the log receivers. There is no convenience for shipping it. The anchorage off Sertunai is bad.

Cape Vozdvijenia (Sjakotan), in lat. 49° 56′ N., is an almost perpendicular bluff about 100 feet high, with a high pointed rock lying off it. Coal is found in the neighbourhood.

KARSAKOV BAY, in lat. 50° 05′ N., affords shelter from south-west winds. Its south point (cape Pilwo) is surrounded by a reef, and 900 yards from it are two isolated rocks above water.

A river, with a depth of 4 feet on the bar, and 7 feet inside, flows into the bay, between high mountains. At about three quarters of a cable from the shore, and parallel with it, is a reef of stones, on which the natives hunt sea-lions. The small (Ghiliak) village of Pilwo or Poro is situated on the shore of the bay.

The COAST from Karsakov bay northward as far as Diu, is high and bold, and of uniform height. In lat. 50° 12′ N. is a remarkable peak 2,000 feet in height, sloping up from the shore, visible from a considerable distance in clear weather. At a distance of from 300 to 500 feet from the shore and parallel with it a reef of rocks is said to extend for a considerable distance.

KOSAKEVITCH BAY, in lat 50° 19′ N., affords shelter from south-west winds, in 18 feet water ; it is surrounded by steep hills and is not inhabited. In the vicinity of Kosakevitch, immediately on the coast, are two remarkably sharp conical hills about 6 miles apart, the southern of which is 2 miles south of the entrance to the bay.

Cape Ategê. — Bearing S. by E. from cape Ategé is a remarkable sharp peak. Between cape Ategé and Kosakevitch bay to the southward the coast has a more gradual slope from the beach to the high range of hills behind, and is well wooded.

Furugelna point, in lat. 50° 40′ N. is surrounded by rocks. A short distance northward of the point, the small river Adgni flows into the sea between rocky points and has a depth of 3 feet on the bar at low water.

DUI.—The Russian settlement of Dui in about lat. 50° 50′ N., long. 142° 14′ E., is situated on the shores of a small bay formed by cape Hoidji on the south, and cape Otsisi on the north. In the vicinity are large coal mines worked by Russian convicts, who with their guards number about 1,500. During the summer months steam transports are constantly running between this place and Castries bay with coal, and from Castries bay it is shipped off to the Amúr and Vladivostok for the use of the Russian squadron. There is a massive wooden pier at the coaling station one mile northward of the settlement, to facilitate the shipment of coal which is stored in a shed on the pier; and whence wooden shoots lead it into the boats alongside. A small stream runs through the settlement; this has been dammed up to work a saw-mill. The coal is said to be nearly equal to north country coal for steaming purposes, burning well with Welsh coal; but it is not of very prepossessing appearance. There is telegraphic communication by cable with Castries bay on the Tartary shore.

Cape Otsisi, the northern point of the bay ends in a conical rock close to which are three remarkable rocks 50 feet high. A reef extends northward from these pinnacles the extreme of which is marked by a white perch beacon.

Cape Hoidji, when viewed from the southward appears as a perpendicular headland, gradually rising inland to a mountain summit, the opposite slope of which is also gradual. Near the cape a fine waterfall falls into the sea.

A reef, extends N.N.W. ½ W. nearly 6 cables from cape Hoidji; it is steep-to on the north-west and south, but from the westward the water shoals gradually.

This reef is marked by two beacon buoys 60 feet apart, the outer in 4¾ fathoms, the inner in 4¼ fathoms, they are said, however, to be hardly distinguishable. From thence to the pier end the water shoals gradually to 3½ fathoms.

LIGHT.—From a square red lighthouse, 40 feet high, surmounted by a grey lantern, situated on the slope of a hill overlooking the settlement is exhibited, at an elevation of 374 feet above the mean level of the sea, a *fixed* white light, visible from seaward when bearing from N.E. ¼ E. (through east) to S. by W., ¼ W., which should be seen in clear weather from a distance of 22 miles.

Fog signal.—During thick or foggy weather a bell will be sounded *slowly*; but on hearing the fog signal of a vessel in the offing the bell will be sounded *rapidly*. A gun will be fired in answer to a gun fired from seaward.

Buoy.— A black mooring buoy is placed in 5 fathoms about half a mile west from the coaling station.

Directions.—Owing to the uncertainty of the current and the prevailing foggy weather it is advisable to make the coast south of cape Hoidji, and coast it northward. To clear the reefs off the above cape keep cape Otsisi bearing N.E. until the lighthouse bears southward of East, when steer for it.

Anchorage.—Small vessels can lie off the pier in 3 fathoms, with cape Hoidji bearing S.S.W. ¾ W., and the lighthouse E.S.E.; but larger vessels should anchor further out in from 5 to 6 fathoms, with the pier bearing East; cape Hoidji S. by W.; and Pinnacle point about N.N.E. ½ E. The bottom in some places is covered with large boulders especially between the 3 fathom line and the shore. It must be remembered that this anchorage is only safe with easterly winds; should the wind shift to the westward it would be advisable to put to sea at once.

The COAST from cape Hoidji takes a gentle curve to the eastward, and is fronted by high cliffs of a reddish colour with outcrops of coal* showing here and there, and is broken by numerous gullies, each having a stream of water.

JONQUIÈRE BAY, a small Russian convict settlement, about 1½ miles north-east cape Otsisi, in lat. 50° 54′ N., may be recognised by three remarkable detached pinnacle rocks, about 50 feet high, off cape Otsisi its south point. The coast to the southward is bold, but becomes less so in the bay and to the northward, as the high land recedes; the country is densely wooded.

Anchorage.—This bay should be looked upon only as a fine weather anchorage; it affords shelter from N.E. (through east) to South; but is exposed to all other winds, and the holding ground is mostly bad; there are some good spots, however, for anchorage, in 9 to 7 fathoms water. A small river finds an outlet in the bay, and boats can pass over its bar when the tide is in.†

The south end of the cliff in the bay bearing East, leads in clear of danger.

The natives are fine handsome people, they wear the front part of the head shaved, the back hair being worn hanging over their shoulders, the men also possess large black beards; these natives are inoffensive and obliging.

A few huts of the natives will be seen on the south part of the river entrance, and contain about 30 Ghiliaks, who possess a great number of dogs, which they use for dragging their canoes and sledges; they also serve them for food.

Coal.—Between these huts and Pinnacle point are seams of good surface coal, some of which, being close to the water's edge, can be easily worked. The land about the river is cultivated, and some cattle were seen.

Supplies.—Large quantities of fish have been taken in Jonquière bay by hauling the seine on the beach to the northward of the huts, and good sized flat-fish caught with hook and line about a quarter of a mile off shore, in 3 or 4 fathoms water. Wild fowl and white hares are numerous. Wood can be got in any quantity up the river.

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* The seams are to be seen on the steep slope of the hill, whence large wooden shoots lead it down into the receivers. The seams are not more than 3 or 4 feet deep, and the coal is picked out by hand with pickaxes. The price is 10 roubles (1*l.*) per ton.

† *See* Admiralty plan:—Jonquière bay, on sheet No. 2,402; scale, *m* = 2 inches.

The watering place is inconvenient. Drift wood is plentiful.

Tides.—It is high water, full and change, in Jonquière bay, at 10h. 0m., and the rise is about 6 feet.

The COAST.—From Jonquière bay the coast trends to the N.N.W., and is bold of approach as far as cape Uandhi, from which to cape Liak at the entrance to the strait of Tartary it appears as an immense plain, broken only by a few craggy hillocks in the interior (the high land having terminated abruptly at the former cape), and is skirted with a shoal bank, which extends to a considerable distance off shore with from 5 to 6 fathoms at 1½ miles. (For directions for Tartary strait, *see* p. 162.)

CAPE THIK (Tyk), is a low sandy point projecting some distance into the sea; it is fringed with sand hills, some of which are covered with shrubs, and have a dark appearance from seaward. The coast northward of the cape continues low and sandy.

The COAST of Saghalin northward from cape Thik as far as cape Golovachef, a distance of 100 miles, is for the most part low and sandy, with numerous streams and lagoons along the beach.

CAPE POGOBI, opposite cape Lazaref (on the Tartary shore is marked by a beacon, and may be recognised by the remarkable sandy landslip on its southern side, and also by a conspicuous white house on its north side.

OBMAN BAY, at 22 miles north-east from cape Golovachef, and 44 miles to the southward of cape Mary, has barely sufficient water at its entrance for boats.

North entrance of the gulf of Amúr, *see* p. 171.

NADEIDA BAY, named after Krusenstern's ship, is about 35 miles North of Obman bay, and 10 miles to the south-east of cape Mary. A plentiful supply of wood and water may be easily procured here, but the bay being open, the bottom rocky, and consequently not a safe anchorage, will preclude its ever being much visited.

EAST COAST of SAGHALIN.—Cape Löwenhörn, or Leveron point, in lat. 46° 23′ 10″ N., is a steep projecting rock, easily to be distingnished from the rest of this coast by its yellow colour. North of it the coast assumes a more westerly direction, and consists of a chain of large lofty mountains, covered with snow in May.

CAPE TONIN, the next headland about 30 miles northward of cape Löwenhorn is of moderate height, and entirely overgrown with fir trees. A chain of rocks stretches to the northward from it; southward of the cape the bottom is rocky, with small stones; to the northward it is entirely of clay. The coast between capes Löwenhorn and Tonin trends due North.

MORLOVINOV BAY, is a large bight in the coast westward of cape Tonin, in which plenty of water was procured, and abundance of firewood. On the shores of the bay several dwelling-houses were seen by Krusenstern, but most of them were empty. The natives appeared to be superior to those in Aniwa bay.

Cape Sieniavin, is a high point of land in lat. 47° 16½′ N., about 35 miles north-west of cape Tonin. To the northward of it the coast is low, and trends suddenly to the westward; to the southward are lofty mountains covered with snow in May.

Mt. Lopatinsky, Bernizet peak of La Pérouse, is probably the same as mount Spenberg of the Dutch, and now appears on the charts as Mt. Lopatinsky. It is a lofty, rounded mountain, in 47° 33′ N., 142° 20′ E., near the north-west end of a lofty chain of mountains running through the valley from N.W. to N.E.

Cape Dalrymple, in lat. 48° 21′ N., is formed by a high mountain rising close to the beach, in a north and south direction, and is the more easily known from being altogether isolated, except that at 12 or 15 miles to the northward, is another, very unlike this, apparently consisting of four separate mountains; the coast between is, with the exception of a peak of moderate height, quite low.

From this cape the coast trends in a S. by W. direction, and is bounded by lofty mountains, divided by deep valleys, the shore being steep and rocky. In several places are inlets between the rocks which might afford anchorage; one in lat. 48° 10′ looked more promising than the rest.

PATIENCE BAY.—Cape Notetu or Saimanov, in lat. 48° 52½′ N., is the western point of entrance to Patience bay, a deep bight, which is limited to the eastward by cape Patience. The former cape is a high promontory, projecting to the eastward, and may be mistaken for an island when it bears north. The North coast of the bay is mountainous, and the beach craggy. Far inland are lofty snow-topped mountains, except in one part, where an even country stretches away to the northward as far as the eye can reach. In the north-west angle of the bay is the mouth of the river Neva.

CAPE PATIENCE, the most prominent and the easternmost cape of Saghalin, is a low promontory, formed by a double hill, terminating abruptly. From this a flat tongue of land projects some distance to the southward; on the north side of the cape the land is likewise low, the flat hill near Flat bay being the first high land in that direction. By this hill, cape Patience (which, owing to its little elevation, is not easily perceived) may soon be recognised. The cape is surrounded by a rocky shoal, extending a considerable distance from the land.

ROBBEN ISLAND, the centre of which bears about S.W. ¼ S., 22 miles from cape Patience, is surrounded by a dangerous reef about 35 miles in circumference. Krusenstern examined this reef in 1805. The waves broke violently over it, and to the northward there appeared, as far as the eye could reach, a large field of ice, under which, in all probability, the reef continued. The channel between the cape and the reef was not examined.

Flat bay, in lat. 49° 5′ N., is surrounded on all sides by low land. It is a deep opening, in which, even from the mast head, no land could be described. From this circumstance it was thought by Krusenstern, to be the mouth of a large river.

CAPE BELLINGSHAUSEN, at 30 miles northward of Flat bay, has at 7 miles S.S.W. of it, a point which was thought to offer a good harbour. The shore is abrupt, and entirely white. Between two hills that project considerably, the southernmost apparently insulated, is this apparent harbour, and perhaps a small river; it was, however, unexplored. The country about it is regular in appearance.

Cape Rimnik, at 40 miles further northward, has at the back of it, some miles inland, a high flat hill, named Mount Tiara, remarkable for having three points on its summit.

Cape Ratmanof, in lat. 50° 48′ N., terminates in a flat neck of land, stretching a considerable distance into the sea. The coast hereabouts is invariably craggy, and of a yellow colour.

CAPE DELISLE de la CROYÈRE, in lat. 51° 0′ 30″ N., forms the boundary of the mountainous part of Saghalin, for northward of it there is neither high land nor a single mountain, the shore everywhere consisting of sand, of a most dangerous uniformity. This cape is connected with cape Ratmanof by a flat sandy beach, with mountains in the background between them.*

Downs point, in lat. 51° 53′ N., is rendered remarkable by a round hill. It is not the boundary of the sand coast, for this continues to the northward of the same features as that to the southward, only that behind this point there is a bay of considerable depth.

To the northward of Downs point is a chain of five hills, having the appearance of islands in this extended plain. The whole coast here, like that to the southward, is scarcely raised above the water's edge; it is entirely of sand, and a little way inland is covered with a seemingly impenetrable forest of low shrubs.

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* *See* Admiralty chart;—Sea of Okhotsk, No. 2,388; scale, $m = 0 \cdot 03$ of an inch.

CAPE OTMÉLOI (Shoal point), in lat. 52° 32½′ N., so named from its vicinity to the only dangerous shoal Krusenstern met with off this coast, may be easily known by a hill of tolerable height, which on this flat coast almost merits the name of a mountain; and forms a remarkable object.

This shoal might have proved dangerous if great attention had not been paid to the soundings, the depth falling suddenly from 8 to 4½ fathoms. It is in lat. 52° 30′ N., long. 143° 29′ E., and extends, probably, some miles north and south at a distance of 10 miles off shore. The coast, the direction of which from Downs point is north, projects to the eastward nearly on the parallel of this shoal.

CAPE VIRST is in lat. 52° 57½′ N. A long way inland there are several considerable high lands, the coast being, as far as the eye can reach, composed of flat sand.

CAPE KLOKATCHEFF is in lat. 53° 46′ N., and near it appeared to be the mouth of a considerable river, as the land appeared unconnected. The land about it is flat, gradually increasing in height, the shores being flat and sandy.

CAPE LÖWENSTERN,* in 54° 3¼′ N., is a large promontory, from which the coast takes a more westerly direction. To the southward of this cape, the land, which has been hitherto flat and sandy, is high and mountainous, with narrow spaces between the hills, the shore very steep, and in several places consisting of rocks of a chalky appearance. In front of the cape there is a large rock.

The land between this cape and cape Elizabeth presents a lofty, dreary, and barren appearance; no traces of vegetation are apparent, and the whole coast is iron-bound, consisting of one mass of black granite rock, with here and there a white spot; the depth at 2 miles off shore was 20 fathoms, and at 3 miles, 30 fathoms, rocky bottom. There are four other promontories between these headlands.

CAPE ELIZABETH, the north extreme of Saghalin, is a high mass of rock, forming the extremity of an uninterrupted chain of mountains. It is rendered remarkable from a number of high pointed hills, or rather naked rocks, upon which neither tree nor verdure of any kind is perceptible. It descends gradually to the sea, and at the brink of the precipice is a pinnacle or small peak. From the northward it appears as two rugged points, the western one being divided into peaks. Seen from the west it bears an extraordinary appearance to cape Lopatka, the south end of Kamchatka, except that it is higher. On the west side of the cape a point projects, and between them there is a small bay.

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* So named after Krusenstern's third lieutenant.

CAPE MARY, about 18 miles W.S.W. of cape Elizabeth, is lower than the latter cape, and consists of a chain of hills all nearly of the same elevation. It slopes gently down to the sea, and terminates in a steep precipice, from whence a dangerous reef appears to project a considerable distance to the north-east.

Tides.—It is high water, full and change, at cape Mary, at 2h., and the rise is about 5 feet.

NORTH BAY (Sévernaia Guba).—Between capes Elizabeth and Mary is a large bay of considerable depth, at the head of which, at the foot of a mountain, is a village in a beatiful valley. The locality is fertile, and the mountains covered with forests of fir trees.

This bay, although open, is said to be safe in the summer when north winds are rare. At 1½ miles off shore the depth is 9 fathoms, fine sand, decreasing half a cable gradually to 3 fathoms over excellent anchoring ground.

The N.W. COAST of SAGHALIN, is infinitely preferable to the south-west. Between the mountains, which are entirely overgrown with the thickest forests, are valleys which appear capable of cultivation. The shores are broken, and almost everywhere of a yellow colour. The confines of the high and low lands are precisely in the same parallel as on the opposite shore; and beyond the limits, to the S.S.W., as far as the eye could reach, nothing could be seen but the low sandy shore, with here and there a few insulated but picturesque sand hills.

KURIL ISLANDS.

This extensive chain of islands extends nearly in a uniform N.E. and S.W. line of direction from the north east point of Yezo to the south extreme of Kamchatka. The Boussole channel separates the chain into two portions; that to the northward was formerly claimed by Russia, but the whole of the islands now belong to Japan. The fog in which these islands are constantly enveloped, the violent currents experienced in all the channels separating them, the steepness of their coasts, and the impossibility of anchoring, are such formidable obstacles, that it tries to the utmost the patience and perseverance of the mariner to acquire much knowledge respecting them.*

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* *See* Admiralty charts:—Kuril islands, No. 2,405; scale, $d=2\cdot1$ inches: and Pacific Ocean, Sheet 1, No. 2,459; scale, $d=0\cdot8$ of an inch.

Making the Kuril islands from the westward during a dense fog it frequently happens that the clear sky overhead allows of the summits of some of the islands being seen over the fog. Such a glimpse to a stranger would have more the appearance of blue sky with a few light clouds (*cirri*) instead of a high mountain streaked with snow.

The vicinity of land in the neighbourhood of the Kuril islands may frequently be known by the flocks of birds, some of which fly off to a distance of 25 miles, those most noticeable being somewhat like a duck, with a peculiar red beak. Seaweed is also met with in straggling patches like the ordinary gulf weed, growing thicker by degrees till near the land it resembles a large field of very thick and strong weed. This weed entirely surrounds all the islands, and in collecting it it has to be cut with a scythe. Nearing the land the wind off the high peaks (perpetually covered with snow) is colder, and closing these islands is much the same as nearing an iceberg.*

KUNASHIR, the south-eastern of the Kuril islands, is separated from the north-east end of Yezo by a channel, named by Krusenstern the strait of Yezo, which is about 9 miles wide in the narrowest part. This end of Yezo forms a deep bay, and the south-east part of Kunashir advances very far into it, so that cape Noyshaf, the eastern extreme of Yezo, entirely hides the strait, from which cause Kunashir and Yezo have often been mistaken for one island.†

The island of Kunashir is high; the principal summit at the north end, being 7,900 feet above the sea; towards the south is another of 3,020, and that farther south is 1,800 feet high. The island is stated to be surrounded with rocks and dangers.

Itmen bay.—Its south-west part forms Itmen bay, the two points of entrance to which bear N.W. by W. ½ W. and S.E. by E. ½ E. from each other, distant 6 miles. The point that terminates the island is a tongue of sand, almost awash, on the west of which is the bay above mentioned. This tongue continues itself with shallow water on which the sea is heavy. At half a mile there are 2⅔ fathoms, and it appears to run to the south-west across to the Yezo shore.

Itmen bay is 6 or 7 miles wide, and is open to the south-west, with a uniform depth of 3¾ fathoms. At its head is the village of Tomari, where about fifty Japanese and some Ainos live by fishing, which is the only produce, the country being bare and uncultivated. Whales frequent the strait, but the natives do not know how to take them.

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* Mr. A. Ponsonby, commanding S.S. *Cleveland*, 1881.

† The description of the Kuril islands is principally from the remarks of Captain du Petit Thours, of the Imperial French Navy, in H.I.M.S. *Dupleix*, of Staff Commanders George L. Carr, and W. H. Drysdale, R.N.

The depth is generally about 33 fathoms, sand and broken shells, to half way between Skotan, and Kunashi, then it decreases irregularly to 8⅙ fathoms at 10 miles east of Kunashir, which must not be approached, the soundings decreasing to 3¼ fathoms, always irregularly.

The *Dupleix* anchored in 3¾ fathoms 5 miles W. by S. ⅓ S. from the south point of Kunashir. Towards the south the depth appeared to diminish a little to 2 miles south of the point where a hole of 9¼ fathoms was found. The shoalest water was 2⅔ fathoms, the deepest appearing to be close to the shore, where the bottom presented an appearance of a series of ditches having no determinate direction.

Cape Rewansi, the north extreme of Kunashir, has a small island off it, as has also cape Moimoto, the north-eastern point of Kunashir.

SKOTAN, is a round island 12 miles in extent, lying 43 miles N.E. by E. from cape Noyshaf, the eastern extreme of Yezo. The southern part is low, and bordered with rocks, and as far as 5 miles from it the water is discoloured and breaks heavily. The north side is rugged and steep-to, indented with several bays that appear to penetrate deeply into the interior. There is a heavy sea near the points, and with fresh breezes from the west it breaks violently in the bays.

The *Dupleix* sailed along the coast at 1½ miles, seeking an anchorage, but all these bays appeared bad. The third bay is the largest, but breakers were seen in the middle of the entrance.

She anchored one mile from the shore in 20 fathoms, the bottom being broken shell, the extremes of the island bearing E. by N. ¾ N., and S. by E. ¾ E., and the nearest point E. by S. ¾ S. distant about a mile. There are 33 fathoms at 1½ miles north of the island. The principal summit of the island is about 1,400 feet high, and the highest north and north-west portions 980 to 820 feet. The aspect is desolate, and no habitation was seen. The space between Yezo and Skotan is much contracted by islands rocks, and reefs (see page 593), which it will be well to avoid. The only safe channel is between Taroko (the most northern of these islands) and Skotan.

CURRENTS.—At the anchorage of Skotan the sea was high, and during the night a current setting east 2 knots was experienced by the *Dupleix*. At one league from Skotan the strong current felt near that island was lost, and an irregular, scarcely sensible, counter current took its place.

PICO CHANNEL, separating Kunashir from Iturup island, is also known as the Catherine channel; it is about 18 miles wide.*

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* H.M.S. *Cormorant* made for this channel, but when close-to, observed a line of heavy breakers extending right across; she then stood nearer the island of Iturup, in the hopes of finding a passage, but in vain, night coming on it was not possible to verify the fact of its being shoal, but the sea broke perpendicularly 20 to 25 feet high, and unlike any tide ripple.—Navigating Lieutenant Neville, R.N.

ITURUP, or STATEN ISLAND, is but little known; but it appears to be about 120 miles in extent, N.E. by E. and S.W. by W., and 25 miles at its broadest part.

Cape Okebets, its north-east point, is said to be high and perpendicular, and to be in about lat. 45° 38½′ N., long. 149° 14′ E.; its south point, cape Rickord, in lat. 44° 29′ N., long. 146° 54′ E.

Anchorage.—H.M.S. *Cormorant* entered a bay on the east side of the island between capes Noneiso and Tosimoinots: it is open but gives shelter from all southerly winds, and is more deeply indented than shown on the chart with apparently deep water throughout. The shores were examined, but no traces of life were observed.

VRIES STRAIT separates the north-east end of Iturup from Urup island; it is 13 miles wide, and free from danger.

URUP, or COMPANY ISLAND, lying on the 46th parallel, is 54 miles long, N.E. and S.W., and its greatest breadth about 15 miles. Near its centre there is a remarkable peak, in shape like a haycock, which can be seen in clear weather at 50 miles, and is often visible when the other portion of the island is obscured by fog. The south-west point of the island is low and steep, and continues so for about 15 miles in a northerly direction, when it rises to a lofty mountain range; a high and almost perpendicular rock, appearing like a sail when seen at a distance, lies S.E. about one mile from the point.

The north-west side of the island is for the most part rugged, steep, and without the least appearance of vegetation, sign of an anchorage, or inlet sufficient to shelter a boat.

Cape Kastricum, the north-east point, is of a dark colour, moderately high, and slopes towards the sea. A chain of rocks extends about 5 miles in an E.N.E. direction from this point; and at a distance of a mile from the shore there is a large rock of pyramidal form, with two others smaller. The island is usually covered with snow late into summer.

Port Tavano is a small harbour on the eastern side of Urup, north-west of another pyramidal rocky islet; but it is open to the eastward, and with the wind from that quarter a heavy swell rolls in, which, with the shallow water and rocks it contains, do not recommend it as a safe anchorage. The entrance has 8 and 10 fathoms water, and is 120 yards across; nearly in the centre of the port there are some rocks just above water, with 4½ and 5 fathoms water close to them.

Water is procured from two rivers at the head of the harbour. Salmon and rock fish are plentiful.

Directions.—The only good mark for port Tavano is the small rocky islet lying S.E. by E. one-quarter of a mile from the south point of the bay; it is steep-to (except for a few yards on its north side), high, conical-shaped, and of a blackish colour. N. by E. 1¼ miles from this islet there is a remarkable point with a hole through it near the water, which can be seen at some distance when bearing North. After passing the small islet above mentioned, the harbour will open, bearing about West, and when the islet bears South the soundings will be 27 fathoms (sand and mud), gradually shoaling as the harbour is approached.

Broughton, Rebuntsiriboi, and Brat Chirnoef islands, are between Urup and Simusir, the next large island to the north-east. The northernmost, Broughton or Makanruru island (Round island of Broughton), is of good height, bold, and abrupt, sloping a little to the southward, near which end are some rocks, and apparently the only place where a landing could be effected.

The two other islands, Rebuntsiriboi or Chirnoi, and Brat Chirnoef or Chirnoi Brothers, lie N.N.E. and S.S.W. from each other, distant 1½ miles. Rebuntsiriboi, the northernmost of the two, is volcanic, and is remarkable from its having two conspicuous peaks of sugar-loaf form. A reef, which much resembles an artificial breakwater, extends a mile east from its north point, and at its extremity there is a high rock.

BOUSSOLE CHANNEL, which, as before stated, divides the chain of islands (Kuril) into two portions, is nearly 60 miles in width between Urup and Simusir island, the small islands (four in number) just described lying nearer the southern side of the strait. It is believed to be clear of danger.

SIMUSIR ISLAND, is 27 miles long, N.E. and S.W., and 5 miles in breadth. Its coasts appear safe to approach, no dangers being visible.

Broughton bay.—Simusir is destitute of any anchorage, except in the northern part, where there is said to be a good harbour, named Broughton bay, which although spacious, is only available for small vessels, on account of a reef lying in the middle of the entrance.

About 10 miles south-west of the north-east point of the island is Prevost peak, a lofty mountain, which, when viewed from the south-east, has the appearance of a cone with the top cut off; it may be seen at a great distance. The south extreme of the island is low, but rises suddenly to a lofty mountain, having a crater on its north-west side.

Cape Rollin, the south point of Simusir, is a high mass of land forming in three rounded summits (when seen from the south-east), sloping gradually to the westward and precipitously to the eastward. The land between the cape and Prevost peak is comparatively low.

DIANE STRAIT, about 15 miles wide, separates Ketoy island from the north-east end of Simusir.

KETOY ISLAND, is high and mountainous, and about 8 miles in circumference. Rocks and islets are said to extend some distance off its north-east and eastern sides, and smoke has been seen issuing from its north-western slopes.*

Ushishir, 12½ miles N.E. by N. of Ketoy, is composed of two islands, each about 1½ miles long N.N.E. and S.S.W., which are connected by a reef 2 cables long. A reef of rocks terminated by a small islet extends to the northward from the northernmost of these islands. The channel between Ushishir and Ketoy is safe.

RASHUA, the next island to the north-east, is about 15 miles in circumference, high, uneven, and barren.

MATUA ISLAND, about 20 miles north-east of Rashua, is 7 miles in length, north and south, and may be easily known by its lofty peak, which rises near its south-west side.

Nadejda strait, which is 18 miles wide, and free from danger separates Matua island from Rashua; the currents in it, however, are strong, and must be particularly guarded against, and unless the wind blows right through, a sailing vessel should not attempt to take it.

Raikoke island, lying 5 miles N.N.E. of Matua, is small but hilly, and has a high peak.

GOLOVNIN STRAIT separates Matura island from Raikoke. In using this strait vessels should be prepared for strong gusts of wind.

Musir islands, are four small islets, or rather rocks, one of which is awash, lying 22 miles north-east of Raikoke. They were discovered by Krusenstern in 1805, and named by him the Snares, on account of the great hazard he ran of being drifted on them by the strong current.

SHIASH-KOTAN ISLAND, at 12 miles north-east of the Musir, is 12 miles in extent, N.N.E. and S.S.W., and 5 miles in breadth.

The two islands Ekarma and Chirin-kotan lie respectively N.W. by W. 5 miles, and W. by N. 24 miles from the north-west point of Shiash-kotan.

KHARIM-KOTAN, the next island, 20 miles north-east of Shiash-kotan, is of a round form, 7 miles in diameter, and a peak rises near its centre.

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* There appears to be some doubt as to whether this island is placed correctly on the charts. On Russian charts it is placed 9 miles westward of that assigned to it on British charts, but from bearings obtained from Broughton bay Simusir island, it would appear to lie between the above positions, or in lat. 47° 21′ N., long. 152° 11′ E. Navigating Lieutenant G. Moody, H.M.S. *Egeria,* 1878.

ONEKOTAN ISLAND, 24 miles long N.N.E. and S.S.W., and 5 to 10 miles wide, makes in several lofty peaks, two of which are dome-shaped.

Shestoi strait, separating Kharim-kotan from Onekotan, is 8 miles wide, and free from danger, but the strong currents in it would make it dangerous to a sailing vessel if overtaken by a calm, or light winds.

Makanrushir island, lies 15 miles W.N.W. of the north-west end of Onekotan.

Avos island, or rock, lies 7 miles S.W. of Makanrushir, and is surrounded by a dangerous reef awash.

AMPHITRITE STRAIT, which separates Onekotan from Paramushir island, is 22 miles wide, safe, and generally used by vessels going from Okhotsk to Kamchatka, or to and from the American coast.

PARAMUSHIR ISLAND, is among the largest of this archipelago, being 60 miles long N.E. and S.W., and of an average breadth of 14 miles.

Paramushir, from its size and appearance, could not well be mistaken ; near its south end is a mountain rising to a high and conspicuous peak, very dark, and unlike the land in its neighbourhood; and to the southward of this are three remarkable peaks. The south-east point of the island is long and low, with apparently a reef extending off it to the southward.

Shirinki and Alaid islands.—A small island about 2 miles in diameter, named Shirinki, lies 9 miles from its south-west point; and Alaid, the most northern island of the chain, 11 miles from its north-west point.

SHUMSHU ISLAND, the northern island of the Kuril chain, and about 15 miles in extent, is separated from cape Lopatka, the south extreme of Kamchatka, by Kuril strait, and from the north-east end of Paramushir by another channel, called Little Kuril strait. The south extreme of Shumshu terminates in a tongue of low land ; the north end is the same, and is distant 8 miles from cape Lopatka, which is also low (*see* page 183).

KURIL STRAIT* is about 3 miles wide, but very dangerous, on account of the strong currents and sunken rocks bounding it on either side From cape Lopatka two dangerous reefs extend about 5 miles in a north-west direction, and from the northern shore of Shumshu a reef extends about 2 miles. On the Kamchatka shore of the strait a depth of 20 fathoms was obtained on entering it, the least water, 9 fathoms, being obtained with cape Lopatka bearing N.E. distant 2 miles. Passing through the strait from the eastward a W.N.W. course in mid-channel leads safely through.

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* *See* Admiralty plan :—Little Kuril strait on sheet No. 2,405 ; scale, $m = 0{\cdot}5$ of an inch.

Tides.—Heavy tide rips occur in the neighbourhood of the strait, often appearing like breakers on shoal ground. The tidal streams set with great velocity through the strait, the flood to the north-west, and the ebb to the south-west, attaining at springs a rate of 5 knots an hour.

LITTLE KURIL STRAIT, between Paramushir and Shumshu, is also dangerous, owing to the strong tides which set 4½ knots in June; the flood to the northward and the ebb to the southward.

There are several small bays in the strait, in one of which, Mairuppo bay, on the east side, is a village.

Kokskar islet, at the southern entrance of Little Kuril strait, is flat, and about 20 feet high. Breakers have been reported as seen at from 1½ to 2 miles N.N.E. from the islet.

Bird islands, three bare rocks, lie off the coast of Paramushir at the south entrance to the strait, leaving a channel about 2 miles wide between them and Kokskar islet.

TABLE OF POSITIONS

ON THE

COASTS OF KOREA AND RUSSIAN TARTARY; ISLANDS SOUTH OF JAPAN; JAPAN ISLANDS, AND SAGHALIN.

WEST AND SOUTH COASTS OF KOREA.

Place.	Particular Spot.	Latitude, North.	Longitude, East.
		° ′ ″	° ′ ″
Ping Yang inlet -	Station island - - -	38 42 32	125 10 16
Sir James Hall group-	Observation spot Ta Cheng Tao (Té Cheng Do.)	37 49 04	124 43 14
Séoul river - -	Observation spot on So Wolmi, Jin Chuen anchorage.	37 27 42	126 35 51·3
Clifford islands -	Observation spot on N.E. rock - -	36 37 34	125 33 41·3
Mackau group -	Observation islet, St. John harbour -	34 41 40	125 25 54
Murray sound, Bate group.	Pearce island, north-east point of bay on N.E. side of island.	34 16 18	126 0 10
Quelpart island -	Observation spot on middle of west side of Beaufort island.	33 29 40	126 56 25
Kuper harbour -	North-east extreme of Josling island -	34 17 20	126 35 28
Port Hamilton - -	West point of Observatory island -	34 1 23	127 18 30
Willes gulf - -	Woody islet, Mi-jo-muk bay -	34 43 18	128 3 23
Tsau-liang-hai harbour.	Observation spot	35 6 6	129 3 2
Sir H. Parkes sound -	Observation islet	35 6 47	128 39 36

COAST OF TARTARY.

Place.	Particular Spot.	Latitude, North.	Longitude, East.
Tsu sima -	Observatory rock, Tate mura (Tsu sima sound).	34 18 55	129 13 6
Port Lazaref -	Observation cape	39 19 12	127 25 0
Expedition bay - -	Tchurkhoda rock	42 38 0	130 48 45
Askold island -	Lighthouse on south point	42 44 0	32 22 0
Siau Wuhu bay -	S. point of Siaichu river - - -	42 54 14	133 50 3
Skrypleff island - -	Lighthouse on south point of island -	43 1 45	131 58 0
Vladivostock	Observation place -	43 6 51	131 54 19*
St. Vladimir bay	Orekhova point - - -	43 53 40	135 26 50
Barracouta harbour	Tullo island	49 1 50	140 19 0
Castries bay -	Lighthouse on Quoin point	51 26 0	140 52 0
Amûr river - -	Nikolaevsk cathedral -	53 8 5	140 42 58
Avatcha bay - -	Petropaulski church -	53 0 58	158 43 30

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* By telegraphic determinations of officers of the U.S. Navy 1881-2. Vladivostock is in 131° 52′ 44″ E.

Place.	Particular Spot.	Latitude, North.	Longitude, East.
ISLANDS IN WESTERN PACIFIC EAST OF LIU-KIU.			
		° ′ ″	° ′ ″
Guam island - -	Fort Santa Cruz (Port San Luis d'Apra) -	13 25 45	144 39 28
Tinian island - -	Sunharon village - - - - -	14 59 22	145 36 20
Saipan island - -	Magicienne bay - - - -	15 18 30	145 44 0
Bonin islands -	Port Lloyd, Observation point - -	27 5 35	142 11 30
MEIACO SIMA, LIU-KIU, ISLANDS, &c.			
Meiaco sima (Yayeyama) group.	Port Broughton, landing place - -	24 21 30	124 14 0
„ „	Port Haddington, Hamilton point - -	24 25 0	124 6 40
Okinawa sima -	Napha Kiang, Abbey point - -	26 12 22	127 40 50
(Liu-Kiu group) -	Observation spot, Deep bay -	26 35 35	127 59 42
„ „ -	Port Oonting village - - -	26 40 42	128 0 0
„ „ -	Tubootch anchorage, East point -	26 39 15	127 53 0
Amami Oö sima -	Oö sima strait, Observation spot - -	28 13 45	129 15 43
„ „ -	Naze harbour, Observation spot - -	28 22 53	129 30 13
JAPAN.—S.E. AND E. COAST OF NIPON.			
Sata no misaki - -	Lighthouse on islet off cape - -	30 58 50	130 40 30
Yura no uchi .	Observation pier -	33 57 34	135 7 33
Osaki bay - -	Tree islet - - -	34 7 42	135 8 31
Yura harbour -	North end of fort - - -	34 16 46	134 58 45
Tanabé - - -	Fossil point - - - -	33 41 14	135 23 16
Siwo misaki	Lighthouse - - -	33 26 20	135 45 40
Oö sima harbour -	Pisayama rock -	33 29 8	135 48 15
„ island - -	Lighthouse on Kashi no saki -	33 28 15	135 52 10
Kada bay -	Outer rock - - - - - -	33 57 37	136 16 28
Owasi bay - - -	South point, at entrance to Chioshi Kawa -	34 6 10	136 14 47
Goza harbour -	Ō sima - - - - - -	34 13 52	136 48 21
Matoya harbour	Sandy spit, south point of Watakano sima	34 21 28	136 52 37
„ „ -	Lighthouse - - - - - - -	34 21 55	136 54 44
Isi sea -	Lighthouse on Suga sima - - -	34 30 40	136 54 50
Omai saki - - -	Lighthouse - -	34 35 46	138 13 28
Gulf of Suruga, Shimidzu harbour.	Mia saki - - - - -	35 0 51	138 31 30
„ Tago bay -	Observation spot near Tago mura - -	34 48 12	138 46 22
Iro-o saki - -	Lighthouse on cape - - -	34 36 2	138 51 12
Simoda harbour -	Lighthouse on Mikomoto - - -	34 34 25	138 56 57
Joga sima - - -	Lighthouse on west end - - - - -	35 8 8	139 37 7

Place.	Particular Spot.	Latitude, North.	Longitude, East.
	JAPAN—*continued.*		
		° ′ ″	° ′ ″
Cape Sagami - -	Lighthouse on Tsuruga saki - - -	35 8 27	139 41 8
Gulf of Yedo - -	Kuwan-on (Kanon) saki Lighthouse -	35 15 18	139 45 12
„ Yokoska harbour.	Eyi yama point - - - - - - -	35 17 20	139 38 50
„ Yokohama	Victualling stores - - - - -	35 26 23	139 38 43*
„ - -	Lighthouse on English hatoba - - -	35 26 57	139 38 10
„ Yedo bay	Lighthouse on fort No. 2, Sinagawa anchorage.	35 37 35	139 46 11
„ - -	Lighthouse on Haneda point - - -	35 31 56	139 48 3
„ Mela head	Lighthouse on No sima saki - - -	34 53 20	139 53 57
Inu-bo-ye saki - -	Lighthouse on cape - - - - - -	35 43 30	140 51 32
Kingkasan - -	Lighthouse on east end of island - -	38 16 57	141 36 0
Kamaishi harbour -	Observation spot - - - - - -	39 16 30	141 52 50
Yamada harbour -	Ko sima - - - - - - - -	39 27 17	141 59 0
Miyako bay - -	South point of inlet leading to town - -	39 38 48	141 59 10
Ishinomaki - -	Light staff at entrance to Kita kami river -	38 26 0	141 15 0
	JAPAN.—W. COAST OF KIUSIU AND ADJACENT ISLANDS.		
Simonoseki strait -	Lighthouse on Shirasu - - - -	33 59 11	130 47 56
„ „ -	Lighthouse on Rokuren island - - -	33 58 53	130 52 31
Yebosi island - -	Lighthouse - - - - - - -	33 41 30	129 58 50
Yobuko harbour -	Observation spot (*see* chart) - - -	33 32 30	129 52 55
„ „ -	Taka sima - - - - - - - -	33 33 38	129 54 0
Hirado sima - -	Taske lighthouse - - - - -	33 23 31	129 33 33
Goto islands - -	Hardy harbour, Mia sima north point -	32 48 30	128 55 52
„ Tama no ura.	Lighthouse on Ose saki - - -	32 36 45	128 36 6
Sagitsu no ura - -	Oonska saki - - - - - - -	32 17 42	130 2 26
Yama gawa harbour (Kagosima gulf).	Beacon on spit north of town - - -	31 12 43	130 37 0
„ „	Light staff at end of breakwater, Kagosima town.	31 32 5	130 30 21
[illegible]	[illegible] - - -	32 36 17	130 12 20
[illegible]	[illegible] - - -	32 44 28	129 51 13*
[illegible]	[illegible] rth corner of [illegible]	32 44 34·6	129 52 9·3
[illegible]	[illegible] - - -	32 43 0	129 45 13
[illegible]	[illegible] - - -	32 42 42	129 49 20
	JAPAN.—WEST COAST OF NIPHON.		
Aburatani harbour -	Kudzu ura observation spot - - -	34 24 36	130 58 42
Tsuno sima - -	Lighthouse on N.W. point of island - -	34 21 30	130 50 0
Sado island - -	Ogi bay, observation spot (*see* chart) -	37 49 15	138 26 25
Niegata - - -	Lighthouse on southern bank of river -	37 56 26	139 3 56
Ohama harbour -	N. side of Kita gawa entrance - - -	35 30 20	135 44 34
Tsuruga bay - -	Lighthouse on Tate ishi no hana - -	35 47 30	135 58 0

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* By telegraphic determinations of officers of the U.S. Navy 1881-2. Yokohama is in 139° 39′ 13″ E. Nagasaki, is in 129° 51′ 13″ E.

Place.	Particular Spot.	Latitude, North.	Longitude, East.
	JAPAN—*continued.*		
		° ′ ″	° ′ ″
Tsuruga -	Town -	35 40 24	136 1 22
Mikuni roads -	Point north of river's mouth - -	35 32 9	135 12 31
Nanao (North) harbour.	Niisaki bana -	37 11 55	136 55 58
Saigō harbour (Oki sima).	Observation spot at entrance to river	36 11 58	133 19 20
Fushiki - - -	Lighthouse on the north-west bank of Minato river.	36 47 47	137 3 42
Awomori -	Light staff in front of town	40 51 45	140 45 15
	JAPAN.—INLAND SEA.		
Naruto passage - -	Su saki (Fuk ura) - - - -	34 14 56	134 42 51
Isumi strait -	Lighthouse on Tomangai sima -	34 16 50	135 0 40
Ōsaka	Lighthouse on Temposan fort	34 39 45	135 26 0
Kobé - -	East pier	34 41 18	135 10 57*
,, -	Lighthouse on Wada no misaki	34 39 20	135 11 0
Akashi strait	Maiko fort	34 38 29	135 1 59
,,	Lighthouse on Ye saki (Awadji sima)	34 37 0	134 59 40
Channels between Harima nada and Bingo nada.	Lighthouse on Nabe sima - - .	34 23 5	133 49 10
,, - -	Lighthouse on Tsuru sima -	33 53 35	132 38 15
Kuru sima strait	South point of Kuru sima -	34 7 0	132 58 5
Suwo nada	Lighthouse on I (He) saki	33 57 43	131 1 52
	JAPAN.—TSUGAR STRAIT AND YEZO ISLAND.		
Hakodate harbour	Entrance to Kamida creek	41 47 8	140 43 44
,, ,, -	Observation spot in British consular garden	41 46 0	140 42 37
Siriya saki - -	Lighthouse on cape - -	41 26 10	141 29 25
Yezo island, Sinmomoran (Endermo) harbour.	Observation spot (*see* chart)	42 19 54	140 59 33
,, Akishi bay.	Observation spot at entrance to shallow lagoon.	43 2 22	144 51 50
,, Oterranai	Observation spot (*see* chart) -	43 11 41	141 0 42
,, Nemoro -	Lighthouse on Benten sima	43 20 30	145 32 0
,, Cape Noyshiaf.	Lighthouse on cape -	43 26 47	145 52 0
,, Notske -	Extreme point of sandy spit	43 53 11	145 18 0
	LA PÉROUSE STRAIT AND SAGHALIN ISLAND.		
Saghalin island -	Tubootchi bay	46 29 3	143 18 18
,, Kosounai road.	Observation spot near settlement	47 58 45	142 13 42
,, Poro Tomari roads	Observation spot (*see* chart)	47 6 30	142 4 5
,, Karsakovsk roads.	Observation spot near pier -	46 38 47	142 47 43
,, Dui -	Lighthouse - - - -	50 50 0	142 6 0

TIDE TABLE for the COASTS of JAPAN, KOREA and RUSSIAN TARTARY; the GULF of TARTARY, SEA of OKHOTSK and KAMCHATKA; and the MARIANA and LIU-KIU ISLANDS.

Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.
	h. m.	ft.	ft.
Japan.			
Yama gawa harbour, Kago sima gulf	7 32	9½	3
Sagitsu no ura	8 0	[illegible]	
Kagosima	6 50	10½	
Nagasaki harbour	7 15	9	7½
Taske (Hirado)	9 44	8½	5
Oosuka	9 15	8½	5
Tama no ura (Goto islands)	8 40	10½	2–4
Ojika seto (Goto islands)	8 40	10¼	2–4
Tatsu maru	7 40	7½	3–5
Taka sima	7 0	9 (approx.)	
Tomari ura	7 10	8	3–5
Kata ura	6 55	8	2–3
Yobuko harbour	9 16	9	6½
Iki island	-	8	
Simonoseki (Mozi saki)	8 30	8	6
„ (West entrance)	9 0	4	1¾
Aburatani harbour	7 0	4	2½
Hiku sima	9 0	4	1¾
Mikuni	- -	2	
Saigo (Oki island)	3 16	1½	
Tsuruga	1 30	2	
Nanāo	2 50	1½	—
Niegata	3 10	1½	—
Sado (Yebisu)	5 0	2	
Hakodate (Tsugar strait)	3 37	3½	1
Yezo island, Notske	4 50	4½	1½
„ Nemoro	5 0	4	2½
„ Akishi	4 30	5	
„ Endermo harbour	4 35	5	
Yamada harbour	4 30	4	
Katsu ura	5 10	5½	4
Tone gawa	5 45	4½	3
Kamaishi	- -	3	
Yokohama*	6 0	6½	4¾
Uraga	5 55	4½	½–1
Yokosuka harbour	5 15	8	4
Tateyama bay	5 50	5	
Fatsizio (Hachijo) island	6 0	5	
Simoda harbour	5 20	6	
Heda bay (Suruga gulf)	—	5½	
Arari bay	5 40	5	
Ye no ura	-	4	
Shimidsu	7 30	7	
Toba anchorage	6 37	6	1
Matoya harbour	6 50	6	1¼
Goza harbour	6 15	6	1½
Owasi bay	7 0	5½	2
Ura-kami	7 30	6	4
Ōsima harbour	6 50	5	4
Tanabe, Kii channel	6 0	6	5¼
Yura no uchi	6 0	5½	4½
Osaki	5 55	6½	
Hachken river	6 4	6½	
Odomari bay	6 48	—	
Su saki and Nomi	6 0	6½	
Uwagima	noon	8–9	
Naruto passage	6 14	6½	4¼
Yura	6 5	6½	—
Isumi strait	6 5	6½	4½

Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.
	h. m.	ft.	ft.
Inland Sea.			
Ōsaka roads	7 30	5¾	4¼
„ city	8 17	2½	½
Hiogo and Kobé	7 15	[illegible]	4
Akashi strait	6 27	3½	1
Ananga (Awadji)	11 27	2 to 4	
F'kuda bay	10 15	5½	3
Uchi no umi (Sozu sima)	11 20	6	2¾
Oo ura (S. coast of Nipon)	10 10	5¾	4¼
Port Wusimado	10 15	6	4½
Tsuda mura	11 50	6½	2
Hanam ura	11 15	5¾	2
Awa sima	0 7	10½	6
Kurusima strait	10 36	11½	5
Hiro sima	11 45	11	8
Siyako	0 16	9½	4
Yuge sima	11 25	11½	6¾
Miwara	10 37	11	5
Gogo sima	10 10	11	7¾
Hime sima	8 45	8	3½
Korea.			
Ping Yang inlet	7 45	21	14
Choda island	6 20	13	
Ta-Tong river	6 30	13	
Salee river, Roze island	4 47	29½	24 to 27
Whitthall group	5 20	24	
Séoul	9 30	6½	
Kam-pai-oul	7 50	—	
Majoribanks harbour	3 30	20	
Basil bay	4 15	18	10
Kokoun-Tau group, Camp islet	2 25	18	10
Mackau islands	1 30	10¾	4
Murray sound	0 17	10	
Nimrod island	8 30	—	
Washington gulf, Green islands	11 0	12	8¾
Nan How group, Port Hamilton	8 30	11	
Kuper harbour	9 28	11½	8¼
Crichton harbour	9 50	11½	8¼
Tracy island	8 58	11½	8¼
Tsau-liang-hai harbour	7 45	7	5
Tsu sima, Korea strait	8 30	8	6
Itsuhara harbour	8 50	6¾	4¾
Seen islands	7 50	7	
Willes gulf	8 0	8–9	
Purvis inlet	9 0	9	
Sir H. Parke's sound	8 47	7½	5½
Russian Tartary.			
Port Lazaref	5 20	2½	
St. Vladimir bay	1 0	2	
Expedition bay	2 30	2½	
Nov-gorod harbour	2 30	2½	
Siau-wuhu bay	No perceptible rise and fall.		
Olga bay	5 30	2 to 5	

* With southerly winds the tide rises about 2 feet higher.

TIDE TABLE for the COASTS of JAPAN, KOREA and RUSSIAN TARTARY; the Gulf of TARTARY, SEA of OKHOTSK and KAMCHATKA; and the MARIANA and LIU-KIU ISLANDS—*continued.*

Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.
	h. m.	ft.	ft.
Gulf of Tartary.			
Barracouta harbour	10 0	3½	
Castries bay	10 30	8½	5½
Jonquiere bay, (Saghalin)	10 0	6	
Amurs trait	11 40	5 to 6	
Sea of Okhotsk.			
Port Aian	12 0	10	
Cape Mary (Saghalin island)	2 0	5	
Gighiga river	3 0	24	
Tigil river	11 0	22	
Kamchatka.			
[illegible]	3 30	6¾	4½
Mariana islands.			
Port San Luis D'Apra (Guam)	- -	3 to 4½	
Magicienne bay (Saipan)	6 45	2½	
Bonin islands.			
Port Lloyd (Beechy group, Peel island)	6 8	3	
Meiaco Sima and Liu-Kiu islands.			
Port Haddington (Pa-chung-san island)	6 45	7	
Napha Kiang road (Okinawa sima)	6 32	7	
Port Oonting (Okinawa sima)	6 35	8	
Aoga ura (Kerama group)	6 43	5½	4
Hancock bay (Amami Oö sima)	7 30	7½	
Porpoise strait (Amami Oö sima)	6 34	6½	4½

* The tides in Avatcha bay are affected by diurnal inequality.

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